

MARINE REVIEW

Entered at Cleveland Post Office as Second-class Mail Matter.

VOL. XXIII.

Published every Thursday at 418-19 Perry-Payne Bldg., by the Marine Review Pub. Co.

CLEVELAND, O., MARCH 7, 1901.

Subscription \$3.00 a year.
Foreign \$4.50 a year.

No. 10

UNITED STATES STEEL CORPORATION.

SOME FEATURES OF THE BIG ORGANIZATION TAKEN FROM THE ANNOUNCEMENT BY J. P. MORGAN & CO. TO THE STOCKHOLDERS OF THE VARIOUS COMPANIES REGARDING TERMS UPON WHICH THEY WILL BE TAKEN INTO THE CONSOLIDATION.

The official announcement of the organization of the United States Steel Corporation is in nearly all respects in accord with what was published in these columns a week ago. The publicity given to it by the house of J. P. Morgan & Co. has been so great that no one in the least concerned in the deal can possibly be unfamiliar with the terms. Indeed, the corporation has spent a pretty penny to advertise the consolidation, for it has taken four columns of reading space for several days in all the leading papers throughout the country—and this is the most costly form of advertising. The language of the official announcement is as clear as sunlight. Among the first facts disclosed regarding the great enterprise is that the authorized capital stock of the corporation will be \$850,000,000 or \$50,000,000 more than was first understood. It will be equally divided into 7 per cent. cumulative preferred and common stock. The company will also issue its 5 per cent. gold bonds to an aggregate amount not exceeding \$304,000,000. The bonds are to be used only to acquire bonds and 60 per cent. of the stock of the Carnegie company. The underwriting syndicate, which, as was previously known, was for \$200,000,000, has made a contract with the United States Steel Corporation under which the latter is to issue and to deliver to the syndicate its preferred stock and its common stock, and its 5 per cent. gold bonds in consideration for the stocks of the combined companies and the bonds of the Carnegie company and the sum of \$25,000,000. It is understood that the \$25,000,000 in cash is for additional working capital for the new company. The list of depositaries of the stocks of the combined companies includes several of the most prominent New York trust companies. Deposits must be made on or before March 20, after which date no deposit will be received except in the discretion of the syndicate managers and on such terms as they may prescribe. The basis of exchange of the stocks of the United States Steel Corporation for the stocks of the various companies has already been published in the Review, but for the sake of cohesion in the narrative it is herewith reproduced:

Name of company and class of stock.	Amount of new stock to be delivered in par value.	
	Preferred Stock.	Common Stock.
Federal Steel Co., preferred.....	\$110	.....
Federal Steel Co., common.....	4	\$107.50
American Steel & Wire Co., preferred.....	117.50	.....
American Steel & Wire Co., common.....	.....	102.50
National Tube Co., preferred.....	125	.....
National Tube Co., common.....	8.80	125
National Steel Co., preferred.....	125	.....
National Steel Co., common.....	.....	125
American Tin Plate Co., preferred.....	125	.....
American Tin Plate Co., common.....	20	125
American Steel Hoop Co., preferred.....	100	.....
American Steel Hoop Co., common.....	.....	100
American Sheet Steel Co., preferred.....	100	.....
American Sheet Steel Co., common.....	.....	100

The syndicate managers state that at any time prior to the deposit of two-thirds in amount of all outstanding shares of the capital stock of any one or more of the companies to whose stockholders the announcement is addressed—which two-thirds in each instance shall include two-thirds of the outstanding preferred stock of such company—the managers in their discretion may withdraw the offer made to depositors of shares of any such company of whose capital stock two-thirds shall not have been deposited. In such case no act or notice of withdrawal shall be required other than the advertisement thereof at least once in each of two daily newspapers in New York city. Deposited common stocks must carry all dividends or rights to dividends declared or payable on or after March 1, 1901, and no adjustment or allowance will be made. In the case of preferred stocks, however, proper adjustment will be made in respect of dividends upon all the shares deposited, so that the registered holders of receipts for such preferred stocks will receive the equivalent of dividends thereon at the rate therein provided from the last dividend period up to April 1, 1901, from which date dividends on the preferred stock of the United States Steel Corporation are to begin to accrue. The announcement further says regarding dividends and the corporation's earning power:

"For the purpose of avoiding the necessity of interruption in the declaration and payment of dividends, when earned, upon the common stock, concurrently with the payment of dividends upon the preferred stock, there has been inserted in the charter of the United States Steel Corporation a provision to the effect that whenever all quarterly dividends accrued upon the preferred stock for previous quarters shall have been paid, the board of directors may declare dividends on the common stock out of any remaining or net profits. Statements furnished to us by officers of the several companies above named, and of the Carnegie company, show that the aggregate of the net earnings of all the companies for the calendar year 1900 was amply sufficient to pay dividends on both classes of the new stocks, besides making provision for sinking funds and maintenance of properties. It is expected that by the consummation of the proposed arrangement the necessity of large deductions heretofore made on account of expenditures for improvements will be avoided, the amount of earnings

applicable to dividends will be substantially increased and greater stability of investment will be assured, without necessarily increasing the prices of manufactured products."

In order to set at rest the wild stories regarding fabulous profits to the house of J. P. Morgan & Co. for bringing about the consolidation, the following terse statement is made: "It is proper to state that J. P. Morgan & Co. are to receive no compensation for their services as syndicate managers beyond a share in any sum which ultimately may be realized by the syndicate."

LAKE SHIPS AND THE STEEL COMBINATION.

Newspaper dispatches have been all wrong as to number of lake vessels that will be owned by the United States Steel Corporation. The number repeatedly stated is 124. It is just half that amount, fifty-six. The fifty-six (all of them are steel) include twenty-two to be acquired from the Minnesota Steamship Co., which is a part of the Federal Steel outfit; thirteen from the Pittsburgh Steamship Co., a Carnegie interest; twelve from the American Steamship Co., recently taken over by the American Steel & Wire, and nine ships of the Mutual and Menominee lines, operated by M. A. Hanna & Co. for the National Steel Co. Even if the Rockefeller properties on the great lakes were included in the big consolidation the number of ships taken over would not number 124, as the Rockefeller fleet, large as it is, numbers only fifty-six vessels, including three that are now on the Atlantic seaboard. The importance of the gigantic Morgan deal from the standpoint of the lake ship owner must not be underestimated, but there are still a few vessels on the lakes to be taken into account while the transportation business continues to grow as it has during the past ten years. It must be admitted that the freight outlook for the immediate future—the season close at hand—is decidedly discouraging to the so-called individual owner, but from all appearances John D. Rockefeller's interests still tend towards the carry end of the business, and apparently more so than at any time since he acquired a share in the trade. It would seem, therefore, that his position should be a matter of encouragement to the smaller owners.

Some of the managers of the fifty-six ships that go to the new steel combination are, of course, a little concerned as to where they will land when the process of concentrating management is undertaken. The same is true of men in charge of mines, docks and other departments. But there is no great amount of worry on this score as yet, as it is not probable that any radical changes will be made for next season, and probably not for a longer period to come, as some of the concerns going into the consolidation are under contract obligations pertaining to ships and mines that cannot be brushed aside in a hurry.

GRAIN SITUATION IN NORTHWEST.

Mr. A. G. Tomlinson, vessel agent at Duluth, makes the following report regarding quantities of grain in store at Duluth and Superior on the 4th inst. compared with the same date a year ago:

	1900.	1901.
Wheat	11,432,979	7,721,119
Barley	172,084	74,617
Flax	312,930	332,356
Oats	157,399	1,017,192
Rye	398,608	310,545
Corn	811,951	4,267,251
	13,285,951	13,723,080

The report adds: "A little business was again accomplished in freights last week at 2 cents, opening shipment. The inquiry for tonnage, however, was not general. The weather has been extremely mild, but is again colder. Clear water prevails about three miles from the piers."

Freight conditions in the Atlantic seaboard trade seem to have grown steadily worse for two or three months past, and it is quite probable that all the owners of lake vessels sent to the coast last fall are regretting their action. Among the better class of vessels that went down the canals are the Hawgood steamers Eureka and Tampico and the Paraguay and Asuncion of the American Steamship Co.'s fleet, managed by Mr. A. B. Wolvin. The Eureka and Tampico will probably come back to the lakes as early as possible in the spring. The condition of low freights probably prompted the charter of one of the Wolvin steamers to Pacific coast interests. She is to go around the horn and engage in trade between San Francisco and Puget sound. Mr. J. C. Gilchrist has four wooden barges—Bacon, Verona, Crosthwaite and Sheldon—on the Atlantic coast. He will bring them back to the lakes in the spring.

The custom house officials at Sault Ste. Marie have made application for another inspector to assist them in their work. They represented to the government that the traffic between the two Saults had grown to such proportions that the office force was inadequate to cope with it. The reply of the government was to make a detailed report upon all rigs, passengers and pedestrians passing to and fro during one week. This has been done with the result that during the week ending March 3 it was found that 2,716 rigs with 5,442 passengers and 6,651 pedestrians had crossed the river. The business, of course, will be largely increased when navigation opens.

At the Lorain works of the American Ship Building Co. another of the eight steel steamers under construction for Mr. J. C. Gilchrist and others of Cleveland was launched on Saturday last and named Venus. Still another of these freighters, the Mars, will be launched at Wyandotte, Mich., next Saturday.

COLLISION CASES ON THE LAKES.

DECISIONS BY THE UNITED STATES DISTRICT COURT AT DETROIT THAT ARE OF SPECIAL INTEREST TO VESSEL MASTERS—THREE CASES DECIDED WITHIN THE PAST FEW WEEKS BY JUDGE SWAN.

Detroit, Mich., March 6.—Three important collision cases of general interest throughout the great lakes have been tried in the United States district court before Judge Swan within the past six or eight weeks and in all of them the struggle between lawyers—men of special ability in their line—has been of a kind seldom witnessed in courts of admiralty. The principal lawyers were Harvey D. Goulder of Goulder, Holding & Masten of Cleveland; John C. Shaw of Shaw & Cady, Detroit, and H. A. Kelley of Hoyt, Dustin & Kelley of Cleveland. The Review printed, some time ago, quite a lengthy extract of the decision in the first case, the Trevor-Crescent City-Manila collision, in which the Trevor was set free and the damages divided between the Crescent City, the Manila and the steamer Maricopa, which had the Manila in tow. The second case, resulting from the sinking of the schooner Fontana in the St. Clair river in August last was decided about three weeks ago, the schooner Santiago being held entirely at fault for the collision. Only a brief outline of the decision was then given. A more extended summary of it will be found below.

On Saturday last Judge Swan decided the third case, that of the Minnesota Steamship Co., owners of the steamer Mariposa and consort Martha against the steamer Wilbur of the Lehigh Valley line and the Troy of the Western Transit Co.'s fleet. The court dismissed the Troy in this action. The Wilbur and Mariposa were held equally responsible and the damages divided between them. The Martha was bound down Lake St. Clair at Grosse point at 10 o'clock at night, Oct. 26 last, loaded with iron ore, in tow of the steamer Mariposa, when she encountered the steamers Troy and Wilbur bound up, and was run into and sunk by the latter. As she was in shallow water, she was raised without great difficulty, but the wreck was probably the worst wreck of a vessel ever recovered after collision on the lakes. The total damages involved was \$78,000, of which the Minnesota Steamship Co., owners of the Mariposa and Martha, claimed \$55,000 and the Wilbur \$23,000. The Mariposa and Martha were represented by Hoyt, Dustin & Kelley, the Wilbur by Shaw & Cady and the Troy by Goulder, Holding & Masten. It was quite generally expected before the hearing of this case that the Wilbur and Troy would be held for racing. The effort put forth on behalf of the Mariposa and Martha was to prove that the two up-bound steamers were racing. On behalf of the Troy, which was leading the Wilbur up the lake, it was admitted that she was proceeding at the rate of speed common to high-powered vessels of her kind; that she continued on towards the down-bound tow at the same rate of speed after the acceptance of a signal to pass to the eastward; that she heard a similar agreement of signals between the down-bound tow and the Wilbur, but that with this subsequent agreement she had nothing to do except, in view of it, to pass to the eastward as far as was prudent, and this her master did. He had reason to expect, it was claimed, that the Wilbur would check and fall in behind him, instead of attempting to pass between him and the down-bound tow, the act which resulted in the collision. The court took this view of the case as far as the Troy was concerned. In rendering his decision Judge Swan said the testimony did not prove that the two freighters were racing, although he had no doubt in his mind that the Wilbur would have been glad to pass the Troy, which was slightly in the lead. The Mariposa, which had the Martha in tow, was liable, for the testimony had shown that she was on the range in the center of the channel at the time she blew her passing signal and did not go enough to the westward of the center of the channel to allow her tow any room to get clear of the Wilbur when she made her sheer. The decision in this case is interesting enough to be used quite fully and will very probably be secured later on.

A copy of the oral opinion in the Fontana case admits of the preparation of quite a liberal extract, although not, of course, in the full language of the court. This case involved a loss of about \$90,000 due to the sinking of the Fontana with a cargo of iron ore. On the night of Aug. 3, 1900, the Kaliyuga, with the Fontana in tow, was approaching the head of the St. Clair river, when she sighted the Appomattox and consort Santiago coming out. It was claimed that the Kaliyuga gave two blasts, which were answered, and, later on sighting the steamer Inter Ocean, also bound up, she whistled twice and got another answer. It was also claimed that the Kaliyuga kept over to the Canadian side, but alleged that the Santiago sheered over when opposite her, so that she struck the Fontana, putting a hole in her and sinking her. The Inter Ocean was on the far side of the Appomattox tow from the other vessels. She was brought into the case on a claim of suction, although she is a very small vessel compared with the Appomattox tow. Hoyt, Dustin & Kelley and Shaw & Cady were proctors for the Kaliyuga and Fontana; Goulder, Holding & Masten for the Appomattox and Santiago and Gray & Canfield of Detroit for the Inter Ocean. The court said in part:

DECISION IN THE FONTANA CASE.

"The night was clear though dark. Each vessel saw the other, and the court fails to find anything in the case indicating that the want of a lookout (termed a stock allegation) contributed to the disaster. The Kaliyuga, coming down the river with the Fontana in tow, seasonably discried the up-coming vessels, the Appomattox and her tow, the Santiago, and at a later time saw the Inter Ocean and her relation to the up-bound tow, which was probably $1\frac{1}{2}$ to $1\frac{3}{4}$ miles off at the time, and she seasonably sounded a passing signal. The evidence bears out the claim made in behalf of the Kaliyuga that to confirm her understanding of the situation as to which of the vessels below had responded and accepted her signal. She repeated it when about a mile away. She received confirmation from the Appomattox. Both vessels approached each other, each fully cognizant of the purpose and intended course of the other. They came together, the Santiago and the Fontana, and while there may be some question as to the exact point of collision, I am inclined to think it did not occur half the length of the Fontana from the place where she was sunk.

"The court is first called upon to deal with the question of fault of the Appomattox. The charge that she did not keep a proper and sufficient lookout is not sustained. All that could have been made known by the presence of another lookout was known at the time to Capt. Stevenson of

the Appomattox, but I do criticize the act of permitting the lookout to leave his station at that time. It is a dangerous practice. I condemned it in the Florida-Roby case and I shall continue condemnation of it. Fortunately for the Appomattox, however, the fault was not in this case a factor in the collision. There was no evidence to sustain the charge that the Appomattox was proceeding up the river at too great a rate of speed. It is also claimed that the Appomattox was in fault in not keeping over to the westerly side of the channel, in accordance with the passing signals exchanged with the Kaliyuga. Had the Appomattox been responsible for the divergence of the Santiago from her course, another question would be presented, but from the view I take of the testimony the Appomattox is clearly guiltless of any participation in producing that divergence on the part of the Santiago. The Appomattox is, therefore, acquitted from the charges brought against her. Her master has been criticized from the standpoint of not having properly looked after his tow in a dangerous locality, especially with reference to her relation to the Inter Ocean. I took the testimony of Capt. Stevenson of the Appomattox to mean 'I was looking out for my vessel, but I was not looking out for the Inter Ocean.' He was not called upon ordinarily to look out for the Inter Ocean. It was the duty of the Inter Ocean to keep clear of him. The position of the Inter Ocean was reasonably well anticipated and looked after by Capt. Stevenson, and certainly it was if the movement of the Inter Ocean to close proximity of the Santiago was sudden, as some witnesses say it was. He could not be condemned if it was sudden for failing to catch it, as he owed a duty to the vessels ahead of him and he was bound to navigate his own vessel with due regard to their safety and trust somewhat—largely, unless the conditions were exceptional—to the Santiago being taken care of by her master and crew. Her watch was there and he had a right to expect, with a competent master, that she would be taken care of, so far as a consort ought to be taken care of."

"Turning to the navigation of the down-bound boats, the Kaliyuga and Fontana, it is charged that the Kaliyuga was in fault in not starboarding. The testimony does not sustain this charge. The testimony of the captains of the Kaliyuga and Appomattox agree, by their signals, by their conduct and by the relative courses they took, that the distance between the vessels was a safe one, and that it was proper and safe to pass, and that they regulated themselves accordingly. They do not agree exactly as to the distance, but both masters agree and all the testimony shows there was nothing to menace the safety of the two steamers as they approached each other; and they were justified in approaching each other at full speed. Therefore, the Kaliyuga is acquitted of all fault."

Regarding the navigation of the Fontana, the court said: "I find nothing to criticize in the conduct of Capt. McCoy. He managed his vessel with due regard to the up-bound tow, and whatever he failed to accomplish in the way of removing his vessel further than the steamer from the approaching Santiago was due to circumstances entirely beyond his control. It may be that the Fontana passed nearer to the Appomattox than did the Kaliyuga. But that is an immaterial circumstance. She passed at a safe distance had the other been navigated in a proper manner." Charges against the Fontana of insufficient lookout and that she failed to follow her steamer were also dismissed and the vessel declared entirely without fault.

"But there is this," the court added, "to be said of the navigation of the Kaliyuga and Fontana. The master of the Kaliyuga has been criticised for checking his vessel when the collision with the Santiago seemed imminent, and for the maneuver he made, with the purpose, as it were, of twisting his vessel around the Santiago, putting his wheel hard apart and then hard astarboard. He had, however, but a great deal less than a minute, probably not over forty seconds, for action. I am inclined to think it was the wrong maneuver, with the tension on the line maintained and the vessel dragged as far over toward the Canadian shore as it could be. But in the emergency in which he was called upon to act, he is not to be censured. As one of the English judges says, a man has a right to think and he ought to have a minute to think in anyhow, and while I think the mature judgment of some of the witnesses whom the court knows very well as master mariners of unquestioned skill would have caused them to follow the other course, I think that Capt. Tulian is not to be criticised because he did not do the very best thing in an emergency which might have tried the nerves of any master, no matter of what years, especially in that locality."

REASONS FOR HOLDING THE SANTIAGO ENTIRELY AT FAULT.

"We come down, therefore, to the question of the Santiago and Inter Ocean. Prima facie, the Santiago having come into physical contact with the Fontana and sunk her, would be in the absence of explanatory circumstances, or some legal excuse, answerable. And it is her position that she had such legal excuse, and that is her defense. And to make good that excuse she has cited in the Inter Ocean. The claim on the part of the Santiago is that while coming up and following her tow, the Inter Ocean, which had twice or three times been refused permission to pass the Appomattox and Santiago bound up, had come so close in her anxiety to gain time, going up the lake, to the quarter of the Santiago, and had unexpectedly and accidentally sheered in closer than her customary course, as she followed the tow up, as to deflect the Santiago from her proper course, and to cause her to sheer to starboard. If that were the case, and the proofs were satisfactory that the divergence of the Santiago from her course was brought about solely by the proximity of the two vessels, and the suction created thereby, the Santiago would be guiltless. It would not be sufficient to condemn her if she was the unwilling instrument of wrong doing, impelled there by irresistible force, and the fault would lie wholly upon the Inter Ocean. That is the necessity of the Santiago's position; having come in contact with and done the damage to the Fontana by sinking her, it is incumbent upon her to make out to the satisfaction of the court that the act was occasioned by the irresistible force, and that irresistible force put in motion by the Inter Ocean. As to that I am somewhat doubtful as to the Inter Ocean, but upon the whole, as the burden of proof lies upon the Santiago to make out that defense, and it is practically the only defense which she has at her command, with some doubt I have come to the conclusion that the proofs are not demonstrative of the fault of the Inter Ocean. I have a strong suspicion that she was within close proximity to the Santiago. I am not inclined to credit the testimony on her part that she kept a course 25 to 40 feet along the shore. That would be, in that particular locality, a most unusual, a most bizarre course; one I do not

think any master mariner would adopt, unless some extraordinary circumstances impelled it. I, therefore, am inclined to question the denial that she was close to the Santiago, as the testimony of the latter's crew make it. Yet, at the same time, there is not that preponderance of proof that would justify me in holding the Inter Ocean. There is some. I have had more difficulty with this part of the case than with any other, for I have no doubt, notwithstanding the disparity between her and the Santiago in size, that if she were as close as Capt. Hebner and Gustav Anderson—and the other man at the wheel of the Santiago put her—some 30 ft.—that moving as she was by means of her own power, the force of suction in that locality and in those conditions would very easily so far deflect and divert the Santiago from her course as to throw the current on her port bow, and account for her paying off as rapidly as she did and shooting out on the path of the Kaliyuga and Fontana. She must have shot out there at a very high rate of speed, and she must have shot out there at least 150 ft., for there is no evidence of the change of course on the part of the Kaliyuga. As I have already found, the Fontana was following the Kaliyuga, so that it does not seem to me the collision could have occurred unless the Santiago shot out there 125 to 150 ft. anyhow. Perhaps her momentum off to starboard was increased somewhat by her contact with the Kaliyuga. I don't know about that.

"Now, with regard to the Santiago, much has been said about her steering qualities. On this score I am required, in justice to the claimants, to discredit the charges made against her. I think that the great weight of the testimony is that the Santiago was a clean-built, fairly good, at least, steering vessel. I find that the great weight of evidence is that she was properly equipped, that she was, as Capt. Hebner testified, as good a steering vessel as most any vessel he had ever seen. I don't go quite that far, but I think she was a good steering vessel, and probably the loyalty and bias of the sailor who commanded her would lead him to give her at least the high praise that he did. I think, therefore, that it follows from what I have said, that it is incumbent upon the Santiago to explain how she came to get off her course; and that has not been explained directly by any testimony, except so far as the proofs tend to make a case against the Inter Ocean. I shall have to render as against the Inter Ocean what is called the Scotch verdict, 'Not proven, and with a strong injunction not to do it again.'

"But with regard to the Santiago, the probabilities seem to me that she certainly failed to make a defense against the proof of the libel, not justified. My surmise is, and I cannot say it is any more than a surmise, that she was suffered to get away a trifle in the current, and the current caught her port bow and swung her to starboard, and caused this terrible disaster. And, I think, as I have indicated, that the position of the Fontana was fairly decisive of nearly the exact point of collision. I think, however, that both vessels were pretty close to the range line. The difficulty adverted by counsel, and the data as was said in the argument, of the range line, is perhaps illustrated in this case. The tendency of a young master and of a man of less experience, is to hold closely on the range line and follow that down, and that is a great danger. It may be that she was closer to the range line than she ought to have been, but the proofs fail to satisfy me of that. I think she was to the eastward of that range, and as I have said, his course is justified and movements of the vessel were justified by the concurrent testimony of both the master of the Kaliyuga and the master of the Appomattox. The result will be the Santiago will have to stand condemned for the full damage."

BUILDERS' TRIAL TRIP OF BATTLESHIP ILLINOIS.

[Special correspondence to the Marine Review.]

Newport News, Va., March 6.—While no official date has yet been set for the builders' trial of the battleship Illinois, now rapidly nearing completion at the ship yard here, it is currently reported that the big fighter will go out about March 12 on her trial spin. All of her guns and the machinery necessary for the tests were in place Feb. 15, when it was originally intended to send the vessel out. Since then splendid progress has been made and the Illinois will be practically ready for commission when she returns from her preliminary trial. Capt. Converse, who was detached from the bureau of navigation to command the Illinois, has returned to the city after a visit to South Carolina friends, and is watching the outfitting of his vessel. He is a Vermonter and entered the service in 1861. He has had several years of arduous service and is regarded as a good and capable officer. Lieut. Com. Richard Henderson, who was detached from the board of inspection and survey, has also arrived for service on the Illinois. He is a North Carolinian and entered the service in 1872. It is not known yet whether he will be navigator or executive officer of the vessel. Some of the jackies for the vessel are also beginning to arrive here. Of course, the vessel will be in charge of a special crew from the ship yard employees when she goes out on her preliminary trial, the government not taking charge of the ship until she is formally placed in commission.

This preliminary trial is both interesting and costly. To begin with the vessel is such a valuable piece of property that the builders find it necessary to put a heavy insurance upon it. Everything is theoretical. There is no reason to believe that there will be a hitch, but if there were it would take only a few minutes to send several million dollars worth of steel to the bottom. When the Kearsarge went out on her preliminary trial the company carried an insurance of \$3,000,000 on the ship and it is probable that a similar sum will be put on the Illinois.

The bunkers of the ship are filled with specially picked steam coal, as an effort is always made to test the running qualities of the vessel, even though it is not a speed test in the general acceptance of the term. Then there is the special crew of about 200 men who lose at least one day's work from the yard, to say nothing of the experts employed in the navigation of the ship. Of course, the members of the crew, as well as half a hundred guests of the company, must be fed, and provisions for three days are stowed away in the hold of the vessel so as to prepare for any contingency which may arise. These expenses, however, are viewed with equanimity when the trial is a success. Jolly good humor prevails on board the ship which is returning from a successful trial. The run is usually about thirty miles out beyond Capes Charles and Henry and return.

W. F. L.

The White Star liner Celtic, which will be larger than the Oceanic, will be launched from Harland & Wolff's yards at Belfast in April.

CHALLENGER MODELS TO BE TRIED IN TOWING TANKS.

In view of the use that is made by navies of the world of tanks for the trial of ships' models—tanks similar to that recently constructed at the Washington navy yard—it is strange that the designers of challengers for the America's cup did not long ago take advantage of facilities of this kind offered at the works of Wm. Denny & Bros., Dumbarton, Scotland, where models of fast passenger vessels have been tried and compared for years past. The announcement that the latest challenger, to be known as Shamrock II, is to be built at the Denny yard, and that her design may be governed largely by the results of tank trials, brings a new feature into the discussion of next summer's yacht race. A writer in the Scientific American says on this score:

"It has long been a matter of surprise to naval men that yacht designers have not sought to obtain the valuable data which could be secured by testing exact models of their yachts in the towing basin. So accurate are the results obtained with the models of battleships and cruisers that it is possible to predetermine how much horse power will be necessary to drive a ship at any given speed, by the simple expedient of towing a model of the same at a given rate of speed through the water, and noting the pull on the towing line. Of course, the problem would be complicated in the case of a yacht. Unlike a warship, she is always sailing at a greater or less angle of heel, and consequently the form of her immersed portion is constantly changing. This complication of the problem makes the peculiar value of towing tank experiments all the more apparent. A form of hull which is easy to drive under a small angle of heel may drag heavily under a larger angle, a fact which was proved in the case of Valkyrie III and of Shamrock. Both of these vessels held their own fairly well with the American yachts in light airs; but they were quite unable to compete with them when the course was sailed in a heavy breeze, and the yachts were borne down until lee rails were awash. Some peculiarity in the modeling of the run and quarters of the English challenging yachts has caused them to roll up a quartering wave, that acted as a heavy drag when the speed ran up to 12 or 13 knots an hour. Thus Valkyrie III drew rapidly away from Britannia and Ailsa in the light airs that prevailed in her earlier trials on the Clyde; but in the strong whole sail breeze of her third race, when the lee scuppers were awash, she pulled after her a quartering wave whose magnitude is easily seen in the well-known photographs representing this eventful race, in which, by the way, she was easily beaten by the three-year-old Britannia. The same defect was seen in Shamrock in her third race for the cup, when, in spite of the assistance of a huge club topsail, she fell steadily behind the cleanly-modeled Columbia, although this beautiful craft had doused her topsail and was sailing under easy canvas. Whether the towing tank will enable Watson to determine why it is that his boats, which are superb in windward work, are invariably so poor in reaching in a strong breeze, is a question which will best be answered off Sandy Hook next summer. By careening the models to the angle of heel which they would assume in a strong breeze, and by adding weight as an equivalent to the vertical component of the wind pressure, it will be possible to produce conditions practically identical to those which occur in a race; and it ought not to take very long to discover what combination of run and quarters will give the least disturbed wake and the smallest stern wave, consistent with the maximum amount of sail carrying power. If Watson is thus enabled to produce a yacht that is as good in running and reaching as his vessels have always been in windward work, we may look for a closer contest than we have witnessed in recent years."

BEST TYPE OF WOODEN VESSEL FROM MAINE.

Boston, Mass., March 6.—The five-masted wooden schooner Rebecca Palmer, another addition to the Palmer fleet hailing from this point, was launched from the yard of Cobb, Butler & Co., Rockland, Me., on Tuesday of this week. This vessel ranks in point of gross tonnage, as the fourth schooner in this part of the world. The larger schooners are the six-masters George W. Wells and Eleanor Percy and the five-master Wm. C. Carnegie. The Rebecca—she will be called by that name oftener than by her full name—measures 2,556 tons gross and 2,125 tons net, the net tonnage being reduced by the erection of bulkheads in the ends. She is 251 ft. keel, 46.1 ft. beam, and 27 ft. depth of hold, and is a complete three-decked vessel with hurricane deck extending clear forward and aft. Her frame is of Virginia oak and contains 527 tons of 40 cu. ft. It is believed that this is the most massive oak frame ever built into a vessel. Her planking is 5¼ in. thick and the ceiling throughout the lower hold is 12 by 14 in. Her lower deck frame is 14 by 14 in., spaced 4 ft. from center to center. Her two lower decks are of hard pine in 4 in. thicknesses and her hurricane deck is of the best white pine, 3½ in. in thickness. Her cabins are finished in quartered oak and mahogany, are steam-heated, and have bathroom with hot and cold water and open plumbing. She has passenger accommodations for five. Her furniture is quartered oak, upholstered in leather. She has a midship house with galley, messroom and quarters for four second officers. Her forward house contains engine room, sail room, carpenter shop and fore-castle for ten men, although she will carry but eight before the mast during winter months and only seven in summer. She has duplex steam pumps with normal discharge capacity of about 200 tons per hour, built by the Hyde Windlass Co. to the special design of her architect, Wm. F. Palmer of Boston, who is also her managing owner. Her engines, boiler, etc., are of Hyde manufacture, specially proportioned for the vessel. She has two 5,200-lb. anchors and 210 fathoms (or about 35 tons) of 2¾-in. Lloyd's chains. Her cargo hoister will discharge about 200 tons per day, and her boiler is of ample capacity to supply a second winch aft.

This vessel will be coppered at her first outward port so as to equip her for foreign trade, for which she has been specially designed and for which she has been given a depth equal to that of the largest ships. About 9,300 yards of material were used in the manufacture of her sails. She will hail from Boston and will be commanded by Capt. David H. Sumner, late of the schooner Maude Palmer, and is chartered for her maiden voyage to the Standard Oil Co. from New York to Havre and Rouen, France.

Chief Engineer Weller announces that the Welland canal will open for navigation on Monday, April 22. Water will be let out on April 8 to allow annual repairs to be made.

CLERGUE'S GREAT ENTERPRISES.

HE REVIEWS WHAT HE AND HIS ASSOCIATES HAVE DONE AT SAULT STE. MARIE AND WHAT THEY PROPOSE TO DO.

The address of Francis H. Clergue at the complimentary banquet tendered him by the citizens of Sault Ste. Marie, which was briefly sketched in the last issue of the Review, is worth more than passing mention. In it he sets forth what the capital supporting him has done and what it proposes to do. His movements are, indeed, Titanic. Of course, there is nothing in the address which is not generally known, but coming from his mouth certain parts of it are worthy of repetition. He touched lightly upon the good fortune which brought him to Sault Ste Marie a few years ago and the good sense which has kept him there since. He grasped at once the strategic manufacturing position which the Sault holds. He complimented the people of the north upon their energy and fighting qualities and related an interesting incident in the trip of the four British steamers across the ocean with the first cargo of steel ever sent abroad by the direct water route of the great lakes.

"You all remember," said he, "the advent here during last year of four ocean-going British ships brought out by us to engage experimentally in the navigation of the St. Lawrence river to the lakes and carry the traffic of the Helen iron mine during the open season. At the close of the navigation season these ships were sent to sea, completing their loading at Montreal with full cargoes for Bristol channel ports. Leaving Montreal in the month of December they encountered on the passage across those unprecedented gales of this winter, which seemed never to end, and which destroyed and disabled many of the best ships on the North Atlantic. I myself crossed through the midst of these gales on one of the largest and fastest ocean liners, and you will believe that I did not fail to see those little ships in my mind's eye when my own big ship was being tossed about like a chip on Lake Superior. Our ships encountered the very worst of the gales. The Monkshaven had her four lifeboats carried away one after another. Her staunch bulwarks were crumbled up like paper and broken in flat with the decks. All connections between the deck and the cabins were battened down, and half the time the officers on the bridge could not see the hull of the ship, which was continually immersed beneath the seas. In the midst of this distress the steel quadrant, by means of which the rudder of the ship was controlled, was broken, and instantly the control of the ship was lost. Apparently nothing could be done, the engines were of course stopped, and the ship tumbled about among the mountainous waves like a wreck. When daylight came the officers and crew set themselves at work to get control of the rudder. Forward were two large spare anchors, and with help of hoists and tackle, after twenty-four hours of struggling through the seas washing the decks, these anchors were gotten aft, lashed and chained to the stump of the quadrant and within forty-eight hours the ship was again under control and off on her course. In the midst of the gale, and while these repairs were being attempted, an ocean liner was sighted, overtook the ship, and signals were exchanged. What think you was the signal displayed from the shaking masthead of the wrecked Monkshaven? Did it announce her disabled condition, and ask for succor? Did it read that her lifeboats were all gone, that the rudder was disabled, and the ship unmanageable? Did they ask to be taken off? Not so! This was the signal which these brave men flung in the winds: 'We are the British ship Monkshaven; please report us all well.' Yes, indeed, the Monkshaven was 'all well.' 'All well' while she had on board officers and crew whose courage and whose sense of duty inspired them to decline assistance under such terrifying conditions. A few hours later the ship was under control, and a week later she limped into Cardiff 'all well' and these British seamen, unconscious of any heroic conduct, knowing only that they had performed a duty well, received their petty dues, and went ashore to mingle with the hundreds of thousands of other British seamen who would behave exactly the same way under the same circumstances."

LIST OF EXPENDITURES AT THE SAULT.

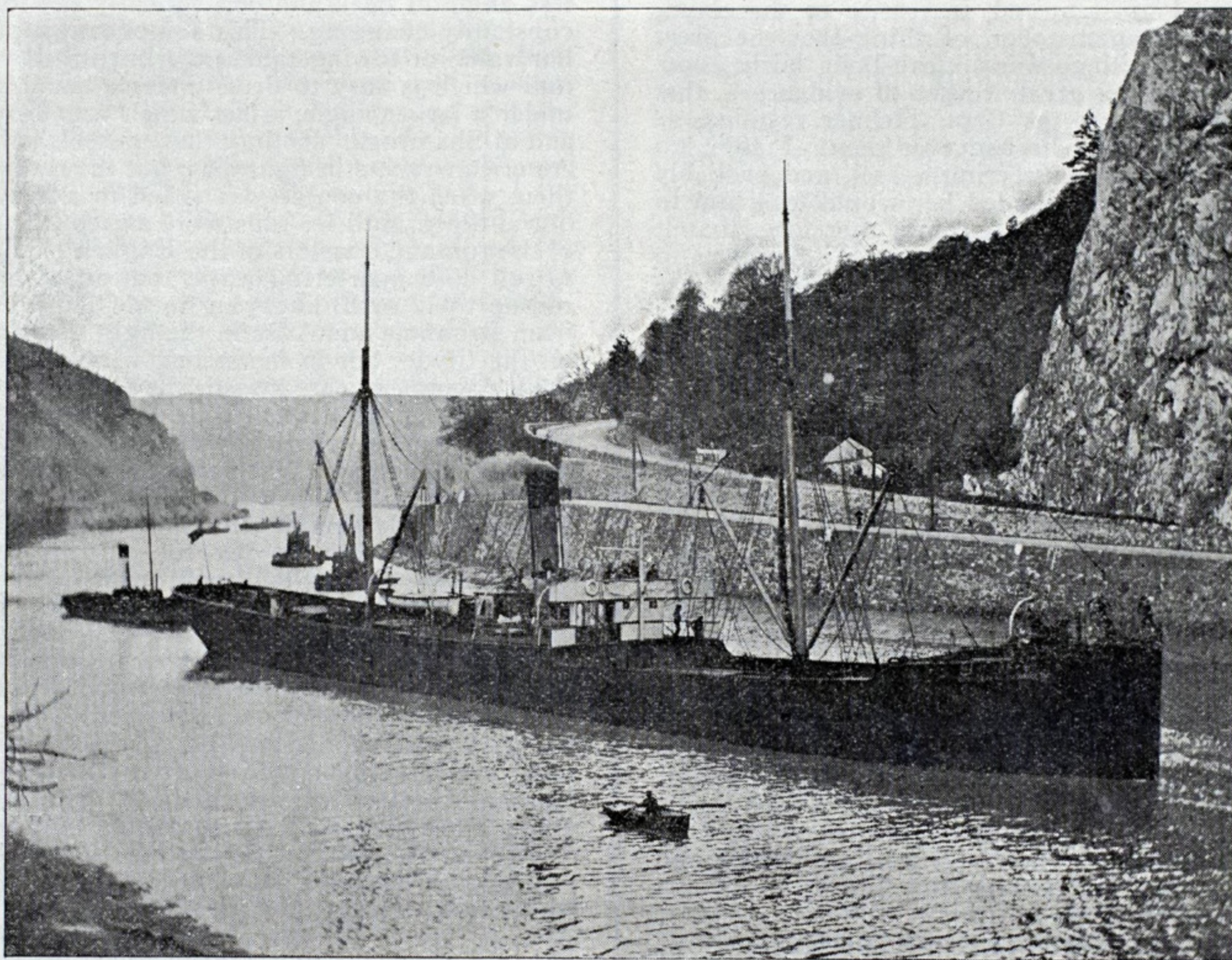
In speaking of the location of the works at the Sault Mr. Clergue says that they will afford exceptional educational opportunities to the youth of the place. The sons of the present generation will become the operatives, the mechanics, the accountants and the managers of the various undertakings. He also caused to be prepared some figures in the auditor's office, showing how much money had already been expended

and how many men had been employed. This is extremely valuable because it is authentic. He said:

"We commenced the operation of the Algoma Iron Works with the present superintendent as foreman, and two machinists. The machine shop, foundry and blacksmith shop now employ 300 men and the annual payroll amounts to \$200,000. We have expended for supplies and material for the iron works, almost wholly in Canada and principally in Ontario, over \$300,000. For wages we have expended \$200,000. The increase in the capacity of these works, which our business now demands and construction for which will commence on the opening of spring, will require an expenditure of \$100,000, and the increase in number of artisans to 600. The Sault Ste. Marie Pulp & Paper Co. has expended in the labor and material for the construction of its works over \$2,000,000, and has expended for labor in operation over \$1,000,000. The number of men now on its payroll is over 1,000 and the annual payroll amounts to over \$500,000. The new pulp mill, coming into operation in the spring, will increase the number on the payroll to 1,500.

"The Tagona Water & Light Co. has expended on construction of its works over \$300,000 and has paid out in wages over \$50,000. The increase to its system to be undertaken on the opening of spring will cost \$50,000 and will employ 200 men during the construction. The Lake Superior

Power Co. has expended over \$3,000,000 in construction and employs 1,000 men with a daily payroll of \$1,500. The additional works to be undertaken on the opening of spring will require 2,000 more men on its payroll, and an additional expenditure of \$5,000,000. These works include an electric street railway, the new power canal and the blast furnaces and steel plant. The Algoma Central railway has already expended over \$3,000,000 in construction, and has had as many as 2,000 men on its own and contractors' payrolls. Four thousand men will be required to carry on the construction this year. The total cash expenditures estimated to be required for completing the Algoma Central railway is \$5,000,000. The Algoma Commercial Co., operating the Algoma Central land grant, will require 1,000 men to conduct its works projected for the coming year. The steamers and steamship lines now owned and operated by the Algoma Central employ 250 people, and the new line to be opened in connection with the Algoma Central this season will employ 250 additional. Expenditures for the steamship line have already exceeded \$600,000, and the addition to our fleet will cost \$500,000 more. The Reduction and Refining



Monkshaven ascending the Avon with Steel from Conneaut.

The above picture in a contemporary sense has greater historical value than any which the Review could present to its readers. It represents the British steamer Monkshaven ascending the river Avon near Bristol with a cargo of steel from Conneaut. The steel was made by the Carnegie Co. and constituted the first shipments of steel ever made to England from the United States by way of the great lakes and the Atlantic. The Monkshaven was one of four vessels which came from England last year to engage in lake trade in connection with the Clergue interests at Sault Ste. Marie. The vessels during the fall on the return trip to England carried Carnegie steel from Conneaut. The photograph from which this half-tone was made was secured by Mr. Clergue during his recent visit to England, and is greatly prized by him.

Works, under construction, will be completed this season and will afford employment for 500 people.

"A summary of these figures shows that we have already expended in works at Sault Ste. Marie or tributary thereto over \$9,000,000, that we have over \$9,000,000 more to expend before the projected works are completed; and these sums do not include our outlays at Sault Ste. Marie, Mich. It indicates that the 3,000 men now on our payroll will be increased to over 8,000 and that about \$10,000 in cash will be distributed daily at Sault Ste. Marie among the builders and operatives of these works. There is a great advantage, which should not be lost sight of, to the community in which capital is expended for industrial works, which does not result from a similar expenditure in railroad construction or buildings of almost any other nature. In industrial works the artisans engaged in the construction thereof invariably remain either as artisans in the works themselves, or as employes on new works, the necessity of which is caused by the original industry. The capital invested in the construction of the railways entering the Saults, or in the great government locks at this point, performed its function as a circulating medium only once. The works were constructed, the laborers paid therefor, and then they dispersed to all parts of the world. No appreciable cash revenue is derived by the community from the operation of these railroads or from the operation of the locks, although, of course, the general interests of the community are much benefited by the facilities for transportation thus afforded. But it is true, that no workman engaged on the construction of any of our works has ever left this community because he could not find employment, and that at wages equal to the highest paid for similar labor in any country in the world."

THE ALPHA AND OMEGA OF MANUFACTURING.

That Clergue comprehends the alpha and omega of manufacturing is apparent from the following line of reasoning which is taken from his address. Cheapness of power and proximity to raw material are the essentials of success; nay, more, they are the safeguards against failure. Upon this point he says:

"The first source of employment of labor and employment of capital the world over, in industrial affairs, is raw material in some form; the

second is the force necessary to transform the raw material into a condition sufficiently finished for its use by mankind. These are the two foundation stones upon which every industrial edifice has been constructed from the days of Noah's ark to date. From the days of the first baboon down to the time of Carnegie, there has never been an industrial failure where the raw material existed to the best advantage, combined with the force necessary for its transformation into practical use. If a combination of the cheapest and best raw material and the cheapest and best force be available it is certain that until the world shall have been surfeited with the product of that force, there will be no limit to the amount of capital which can be profitably invested in the development of that raw material and that force. While those who originate the development of such conditions will enjoy the first profit, the whole civilized world will participate, since the inevitable result will be a distribution in the world of a necessary material at a lower cost. If similar enterprises and undertakings, conducted in less favored localities, suffer from competition or a lowering of prices and if indeed they be obliged to abandon their undertakings, that will be the inevitable result of an illogical foundation, and, while some individuals may suffer, the great community is benefited. This is a natural law which no human artifice in the world, whether of trusts, of tariffs or of labor unions, can overcome. This is the sort of reasoning which has led the gentlemen associated with me to plan and carry out on an unprecedented scale the development of the hydraulic power at Sault Ste. Marie, and the utilization of the raw material adjacent thereto. You will understand our reasoning and the policy when you observe that we are not projecting a cotton mill here in competition with those erected on the cotton plantations of the southern states, nor a sugar factory against those of Cuba or Jamaica; nor a silk mill in competition with those of Lyons; nor a woolen mill which could be equaled in advantages in a thousand places over the globe. On the contrary, you will observe that every operation and process has been based first upon the resource of local raw material and secondly on the power originating on the spot. I think I can justly claim that there is no industrial undertaking on the globe where there is a more complete absence of recklessness, and a more complete presence of the soundest and most conservative and logical business reasoning. If you have any lingering doubt left you must be worse than Thomas, and had better move to a community where your doubting disposition will find more consolation. Another evidence of the stability of our undertakings here to which I can point with pride to show the conservatism and caution which have been practiced in connection with our works is the fact that every dollar of this vast expenditure has been provided directly from the pockets of the shareholders of the company; not a mortgage nor a bond of the company has ever existed. The actual hard cash is and always has been provided and in the bank in advance of the expenditure. The shareholders of this company have not imposed on a gullible public a large issue of bonds secured by a mortgage of the property sufficient to more than equal all the expenditures necessary, wherein the bond holders suffer a loss if unsuccessful and the shareholders get the most of the profit if successful; on the contrary, they have taken the first risk and the only profits they look for from their enterprise are those legitimately made from its actual operation."

GENESIS OF THE PULP MILL.

Even were it necessary to assemble the raw material from distances, Mr. Clergue insists that nowhere in the world could raw material be assembled more cheaply, for nowhere in the world are the transportation charges so low. The raw materials in the region tributary to the Sault first suggest themselves for manufacture. These consist of all kinds of woods indigenous to northern forests and many mineral products. The agricultural products which will follow the clearing of the land are not directly of interest to manufacturers, but their progress and development will go to the great profit of the farmer because of the fact that not for many years will the farming population be able to supply the consuming population assembled at the factories.

"Let me illustrate the common sense basis of one of our manufacturing," said Mr. Clergue, "that of the pulp and paper factory. The paper used in the arts is prepared and produced from the tree trunk, a part of which is subjected to the face of a grindstone under pressure, and a part of it to the action of sulphite of lime under steam pressure. To grind wood into pulp requires seventy-five horse powers daily to produce one ton of pulp. Therefore, 100 tons of pulp daily will require 7,500 H.P., furnished constantly on the water wheels for twenty-four hours. This is the product of our No. 1 mill, although its capacity may be 25 per cent. more. The development of this amount of power can be accomplished here at a cost as low as at any other location in the world. The wood most desirable for paper manufacturing exists in large quantities throughout the country adjacent to the Sault. To utilize the water power the pulp mill was built; to procure the pulp wood the railway was built. The pulp mill and railway being built, the pulp wood must be got for transportation to the mill, and the result is that the land must be cleared, and the land cleared is taken possession of by the farmer who immediately finds waiting an impatient market where he can get Boston prices for his products. Is this not logical and conservative? Can wood pulp ever be produced more cheaply? As long as wood pulp must be used, this mill must prosper and the railway and the farmer thrive."

MANUFACTURE OF CHARCOAL FOR IRON MAKING.

He then reviews the causes which led up to the establishment of the nickel steel works which are now under construction. After touching upon the fact that coal can be delivered cheaply at the Sault by the up-bound lake fleet, he dwells at length upon the fact that charcoal, instead of coke, will be used in the manufacture of steel.

"The vast forest area tributary to the Algoma Central," said he, "reveals the fact that we have over 1,000,000 acres of hard wood forests of the best possible quality for charcoal, available to the steel plant by means of our railway; our engineers have discovered that we can make charcoal pig iron as cheaply as coke iron is made in any part of the world. From the days of Titan charcoal iron has always commanded higher prices than coke iron because of its better qualities. Should there be any doubt as to the permanent and successful operation of the charcoal nickel steel works in competition with the rest of the world? Is it not apparent that our steel plant is carefully thought out, fully considered and a soundly based operation? Twenty-five acres of land must be cleared daily to supply our charcoal furnaces and 300 farms of twenty-five acres will thus be

cleared every year. The laborers to provide the fuel for these hungry furnaces are not those of Pennsylvania; the railway transporting it will not be traversing the state of Ohio. Canadian workmen will be felling the trees, burning the charcoal and operating the trains which bring this fuel to the maw of the furnace. Does not this operation seem to be based upon the rules of common sense? But the process goes still further. In transforming the wood into charcoal the ordinary process will not be used, but the valuable constituents of the wood which do not form part of its usefulness as fuel will all be preserved. In the preparation of the smokeless powder for the British army and navy one of the chief ingredients is a product of the chemical distillation of wood and in the production of this product and wood alcohol hundreds of people will be employed and the cost of the fuel very much lessened by the resulting profits."

Mr. Clergue pays a high tribute to what he considers the far-seeing wisdom of the Canadian government. He justifies the land grants to the Algoma Central Railway and says that if half a dozen syndicates would agree to build railways in Canada he would advocate granting land to all of them. He attributes the long-continued industrial stagnation in Canada to the fact that the country has been exporting its raw materials for a quick return in money. This has had the effect of bringing in cash readily to a certain degree, but has limited the employment of labor.

"This was not philosophy nor sound business," said he. "It was merely building for the day."

SUMMARY OF PRESENT CONDITIONS AT THE SAULT.

In summarizing the conditions which the captious critic would find at present at the Sault, Mr. Clergue says:

"He would find that in the different lines of industry we had expended here in the neighborhood of \$9,000,000 cash, all of which has been foreign money injected into the circulating medium of Canada to remain forever to the everlasting blessing of thousands of its inhabitants; that the completion and successful operation of our undertaking will require the expenditure of a sum nearly as large; that several thousands of inhabitants had found new employment in these undertakings at a higher scale of wages than had ever before prevailed in Canada; that the passenger earnings of the little Canadian Pacific station at Sault Ste. Marie, which were \$15,000 in the year 1895 had grown to \$61,000 in the year 1900; that the freight earnings of the same little station had grown from \$25,000 in 1895 to \$142,000 in 1900; that all the Canadian steamship lines operating to Sault Ste. Marie had to put on additional steamers and that they were still unable to carry all the freight we required; that our works sent over \$300,000 in cash to Georgian bay ports last year for purchases; that we sent nearly as much to Hamilton and nearly as much to Toronto; that the machinery and electrical supplies that we have purchased from Peterborough have amounted to over \$100,000; that Brantford, Galt, Dundas and every other Ontario town engaged in mechanical manufactures had received from \$25,000 to \$200,000 of patronage from us; that our requirements had advanced the price of horses and nearly all farm products in that part of Ontario tributary to Sault Ste. Marie. In fact for the year 1900 we expended in farm products and manufactured materials more than \$1,000,000 in the province of Ontario alone, besides a very large sum in the province of Quebec. By looking over our estimates for the year 1901 he would see that our requirements of a similar character from southern Ontario will amount to more than \$2,000,000 and that additional steamship lines are being inaugurated from Georgian bay and Lake Huron points to Sault Ste. Marie on the opening of navigation. That the railways entering the American Soo have announced additional passenger train service to bring impatient travelers to Sault Ste. Marie, and that the Canadian Pacific railway is putting on an additional passenger service to Sault Ste. Marie for the same purpose. Looking over our office staff he would find scientific and classical graduates from every college in Canada, clerks from nearly every bank in Canada and accountants from almost every city in Ontario. Among the artisans, mechanics and laborers he will find nearly every town and city in Ontario represented, and all of these people have assembled here because they found the rewards of labor greater than elsewhere. With this information acquired, the critic will naturally ask, 'What great compensation has induced this astonishing display of effort and energy?' An investigation of our accounts will show that these expenditures commencing six years ago, had yielded no return at all for the first three years; that the works then commenced to get into full operating condition and from that time onward there has been a satisfactory progress in the earning capacity of our various establishments as they have gradually come into operating conditions. The advantages of raw materials which we shall enjoy by means of the Algoma Central land grant will beyond doubt yield a large income on all the very great investments necessary for its utilization; but this recompense can only be enjoyed in the fruition of time and undertakings of the magnitude of ours should not be entered into by those who cannot 'Learn to labor and to wait.' The enthusiasm to commence them and the courage to complete them can all be had when sustained by the good will and the cordial sympathy of the people and the public men of Canada, but an ambition which will conceive such things will be quickly dulled and a courage which will carry them out will be quickly chilled, if, as soon as energetic action gives evidence of the serious intention of carrying the projects through political interests make them the object of attack."

The torpedo boat Shubrick, built by the Wm. R. Trigg Co., Richmond, Va., was given her trial trip last week. Her speed requirement under the government contract is 26 knots. Her mean speed on the trial was 27.36 knots. During a short period she maintained a speed of 28 knots. The maximum number of revolutions of her engines was 398. The official trial will be held off the Barren island course opposite the mouth of the Patuxent river, in the near future. There is no doubt whatever that the little craft will acquit herself admirably.

There are over forty steamers afloat whose sole work is the laying and maintenance of the world's vast system of telegraph cables; seven of these belong to government administrations, and the remainder to manufacturing and cable operating companies. Ten of the cable laying ships are owned by the three largest English cable manufacturers; one of the largest of these cable ships is of about 5,000 tons displacement, with a carrying capacity of 8,000 tons, and has carried 2,500 nautical miles of deep sea cable in one trip.

HOLLAND'S SPEED ENDURANCE TRIAL.

LIEUT. COM. EDWARDS' REPORT IS NOT AS FAVORABLE AS IT MIGHT BE—
CONGRESS, HOWEVER, ORDERS THREE MORE SUBMARINES.

The naval bill, which has just been agreed upon, calls for the construction of three additional submarine boats. This makes a total of eleven now building for the United States navy. The government is therefore well committed to the policy of submarine torpedo boat construction, a feature of naval defense which has not yet been indorsed by the British admiralty. Lieut. Com. John R. Edwards of the United States navy has made the following report upon the recent speed endurance trial of the Holland:

The hull of this submarine boat is practically a spindle, every vertical transverse section of which is a circle. The greatest diameter is about 11 ft., the ends being about 3 ft. With such a contour the mechanical appliances must necessarily be crowded together. Under surface propulsion the motive power is a gas engine of about 45 H.P. From the shaft of this engine a set of gearing operates the propeller shaft. For want of air, as well as by reason of the danger of using gasoline, this engine cannot be worked under water. For submarine propulsion electric motors are used. These motors are worked by a current of electricity from a storage battery. The main motor, through a set of gearing, works the propeller shaft, while the auxiliary motor operates the bilge pump and also an air compressor. There is a steering engine for working the vertical rudder and a diving engine for working the two horizontal rudders. These two engines are worked by air from six storage flasks. These two engines have oil controlling cylinders. There is a storage battery which is charged by the gas engine working a dynamo. This dynamo is convertible into the submarine propelling motor. There is also an ignition battery for producing explosion in the gas engine. This small battery is of low voltage and is also charged by the gas engine. The storage flasks are charged to 2,000 lbs. pressure. The steering and diving engines are worked by an air pressure of 50 lbs., a reducing valve preventing higher pressures reaching these appliances. A pressure of only 10 lbs. is required for blowing out the submergence tanks, another reducing valve controlling this pressure.

The Holland started from Annapolis at 1:30 p. m. Tuesday, Jan. 8, and reached the navy yard, Norfolk, about 1:30 p. m., Thursday, Jan. 10. She was actually under way 25 hours and 36 minutes. She made one stop of about three-quarters of an hour on account of the propeller motor gearing running warm. She made a second stop of about 5 hours to recharge the storage battery. This stop was made 16 hours after she left Annapolis. A third stop of 2 hours was made on account of the after line bearing becoming warm. After she had been under way, repairing, or charging her storage batteries for 36 hours she anchored for about 13 hours to give the running crew a needed rest. The actual distance run by the Holland, as furnished by her commanding officer, was 145 miles. The weather throughout the trip was favorable for the trial. I was informed by the boatswain commanding the United States tug Standish, which convoyed the Holland, that probably at no time during the winter would conditions be more favorable for the test. The boatswain commanding the Standish has been taking tugs up and down the Chesapeake for the past ten years, and he ought to be particularly well qualified for giving an opinion as to the weather conditions. When the wind was against the tide during the trip there was a little sea. There was no fog at any time, and only for three short periods was there any rain. In general, more favorable conditions could not have been expected at this season of the year. The trip was entirely a surface run. While actually under way the speed secured was exactly 5 2-3 knots. The maximum speed over the ground was 7 knots. There was no log recording machine on either the Standish or the Holland, so the speed could only be ascertained by noting the time between shore stations. The tide question can be thrown out of consideration, since the Holland had as much tide in her favor as against her. The Holland had about 18 in. free board. Her three torpedoes had been left on shore. The oil tanks were practically full. For about one-third of the time two extra passengers were carried, in addition to the regular navy crew. For two-thirds of the time only one passenger was carried beyond the regular crew. There was a thoroughly competent and trained crew in the boat during the run. Two years ago I watched the civilian crew of the Holland manipulate her machinery, and the navy crew was their equal in nerve, skill and readiness of resource. The Holland was, therefore, not at any disadvantage in respect to personnel. For months preceding the time that the navy crew were placed in charge, Lieut. H. H. Caldwell, the commanding officer of the Holland, had seen the civilian crew of the submarine boat work her appliances, and therefore he had an excellent chance to compare the efficiency of the two crews. Lieut. Caldwell not only informed me that the navy crew were perfectly familiar with the working of the Holland, but also that the various mechanical appliances were in better condition than when the navy crew were placed in charge. For hours I personally watched the navy crew carry on their work, and they were thoroughly competent to perform their duties. While starting up the electric motor, after stopping to charge the batteries, one of the bars of the armature of this motor burnt out, thus entirely throwing the electric propelling engine out of use. Fortunately for the test, both the storage and ignition batteries as well as four of the six air flasks had been completely charged; otherwise the test might have ended at that point. The disablement of this motor prevented the propeller backing. It also prevented the recharging of the air flask and storage batteries. The boat would therefore be helpless when either the air supply, the ignition current or the storage electric current should be exhausted.

The armature of the dynamo had been turned over to the government in an impaired condition. Previous to the acceptance of the Holland by the navy department this submarine boat had been sunk by accident somewhere on Long Island sound. The salt water had impaired the armature, and thus trouble has been had with the motor ever since. The impairment has been of such a nature that mechanics from Philadelphia have heretofore been called upon to fit new bars to the armature. The Holland people have also appreciated the serious condition of affairs, for at their own expense they are now having a new armature made, which will be ready for installation about Feb. 1. With the exception of the impaired dynamo, which the navy crew was not at all responsible for, the condition of machinery was very good. I was informed by the commanding officer of the

Holland that it was now in better shape than when it was turned over to the government. Both the propeller and driving shafts need lining up. I understand the navy crew have improved matters in this respect also, for a hot bearing was a much more frequent occurrence when they took charge than it is now.

DEPENDENT UPON PHYSICAL STRENGTH OF HER CREW.

While actually under way the average oil consumption was 5 gallons per hour. The oil tank capacity is about 1,300 gallons. The oil used during the entire trip between Annapolis and Norfolk was 175 gallons. If it was only a question of oil consumption, therefore, the boat would have a large steaming radius. The endurance of the Holland is not only dependent upon her fuel supply, but also upon the physical strength of the crew. Careful watch must be kept while the batteries are being charged, as well as when the propelling engines are in operation, and there must naturally be a limit as to the time when men can remain continuously at work. The facilities for sleeping, as well as for cooking, must be limited, and it is therefore a question as to whether the crew can remain aboard at sea for needed rest. Since the Holland is practically a steel spindle and has no non-conduction substances over her hull plates, the temperature during the test did not rise over 60°. In fact, it was so cold that one of the crew told me that he was not able to sleep while not standing watch. During the first half of the run two electric heaters were used to make the men comfortable. During the last half of the run it was not deemed advisable to use them, since they consumed so much current of electricity that it was apprehensive that the storage battery would run down. Since the sea was smooth during the speed endurance trial the ventilators and the hatches, of course, could be used in the most efficient manner for securing desirable temperatures.

While on the Holland I was permitted to look over her log books. These records extended over a period of at least one year. I could find no evidence that either the electric propelling motor or the gas engine had ever been previously in continuous operation for a period of six successive hours. It is extremely doubtful if the boat ever previously ran, under surface propulsion, a continuous run of over 30 miles. I was informed that the boat was towed from New York to Washington when she was brought around to the latter city to be inspected by the senate and house naval committees. With the exception of running a few hours under her own motive power, she was towed from Washington to Newport, R. I. The tug Josephine towed her to New York and the United States tug Osceola towed her from New York to Newport. After being at Newport several months the Holland was towed, with the exception of about 12 miles; from that port to Annapolis, Md., the United States steam tug Leyden and the United States gunboat Alvarado being employed to tow her between Newport and Annapolis. I have even been informed that when the Holland was at Washington for the benefit of the navy department and the naval committees a tug occasionally towed her to the points, where she dived and maneuvered for the instruction of the government officials.

For surface propulsion, barring accidents, the boat is well arranged for securing good ventilation. Directly over the gas engine is a ventilator, and in the base of this ventilator is an electric blower. The conning tower serves as an excellent air shaft. There is a second ventilator, so that it is possible to secure a good circulation in the hull. For surface work, therefore, only an accident to the gas engine could cause discomfort or danger to the occupants. Under submarine conditions, however, different ventilation can be expected. The ventilators and hatches must of necessity be closed. Gasoline is a great searcher, and if there is a defective joint or weakness in the piping it will be found by this combustible. One of the resultant products of combustion of gasoline is carbonic oxide (carbon monoxide), a deadly poison. Since this gas is odorless, it is particularly dangerous by reason of its insidiousness. Although the gas engine will not be used for submarine work, yet an accident may happen which may cause the gasoline to leak, and in this manner the odorless deadly poisons may be formed. A short personal experience of my own during this speed trial may show how it affects others than the regular crew. The first hour that I spent in the engine room of the Holland was an exceedingly trying one, for there was just enough odor from the gas to make me uncomfortable. Afterwards I became accustomed to existing conditions, and did not seem to notice any disagreeable odor for the rest of the day. The following morning, however, I not only had something of a headache, but for several hours experienced a nervous sensation which I have never undergone before. The crew who were in the engine room about three times as long as I was, it is but fair to state, did not seem to be affected in any manner.

DANGER FROM USE OF GASOLINE.

In using three distinct systems for securing mechanical energy the Holland has an inherent weakness. In this small boat of 75 tons, gasoline, electricity and compressed air are used for different purposes. Gasoline is extremely liable to catch fire. At least one of its products of combustion is extremely dangerous to life. It is very attenuated, and, therefore, a great searcher. If there is a defective joint or pipe or leaky valve the gasoline will find it. When it is used in an engine that appliance should be in excellent condition. After the armature of the motor burnt out it became necessary to start the gas engine without the assistance of the electric motor. To secure the requisite amount of air for insuring an explosion at the start recourse was had to the reduced air pressure in the pipes. It took at least twelve minutes to start the engine in this way. During the effort there was a small discharge of gas into the hull from some improper working of the valve. Even from this small leakage the machinist in charge of the motor became very much distressed, and when he came on deck to overcome this faintness by securing fresh air, he appeared very pallid and not far from collapsing. This sight impressed forcibly upon my mind the danger of using gasoline.

In a boat of the character of the Holland it must be difficult to keep the electric motors in a high state of efficiency. The compartment must of necessity be damp, and therefore drops of water are likely to fall on every part of the dynamo. Salt water is likely to fall down the hatches and ventilators, thus impairing the ventilation. Through accident the boat is likely to sink at her dock, for this very mishap has occurred when the inventor was trying to sell the boat to the government. The air flasks may be an element of danger, since they are charged with pressure of 2,000 lbs. The explosion of any one of these tanks would destroy the

vessel. There are reducing valves for regulating this pressure, but any careless, inexperienced, or evil-disposed person might cause a serious casualty to the boat by tampering with the reducing valves. These valves are so exposed that it will not be a difficult matter to tamper with them. The gas engine is so closely installed to both the main and auxiliary motors that it will be a very difficult matter to do any extensive overhauling or make important repairs. In fact, the three appliances are so bunched together that it will take at least ten working days to line up the shafts for this little craft. There are three sets of gearing. The gas engine is geared to the main shaft. The main motor is also geared to this shaft. The auxiliary motor is geared to a countershaft, which works the bilge pump and air compressor. The use of gearing on board any ship is at least inadvisable, for no matter how strong the hull is made there must be in a seaway some working of the vessel, and therefore the strain on the gear at times must be very great. The noise in the engine room is a serious disadvantage. Since the gas engine is subjected to shock rather than to steady pressure, and since it has tripping arrangements for admitting the gas, the engine itself makes considerable noise. The electric motor must not only be kept in readiness for backing purposes, but also for quickly starting the gas engine, and so there is noise from the motor's set of gearing. Since the compressor is kept in continuous operation to maintain the pressure in the air flask there is noise from that gearing. There is noise from the gearing between the gas engine and the propeller shafts. Any accident to the ignition battery would throw the gas engine out of operation, and it would appear that this may prove a serious weakness.

SUMMARY OF MECHANICAL WEAKNESSES.

From the above it will be observed that the Holland has serious mechanical weaknesses. From each of the three motive powers—compressed air, gasoline and electricity—accident or danger, due to the conditions of installation, may happen at any time. The Holland appeared to me as a spindle-shaped boat with very little freeboard. Even for the surface propulsion she need have no superstructure except the conning tower. It is extremely doubtful if she is much more visible under many conditions when she runs semi-submerged than when she runs as a submarine craft. It would be extremely difficult for any enemy to detect her, but it would also be extremely difficult for any enemy to sight any gasoline or electrical launch that had a spindle hull. Every appliance that was installed was either a commercial auxiliary, or else it was of such a nature that a substitute could be secured from any large supply house. I not only looked for, but made inquiry for, any distinctive invention. There was pointed out to me a tank constructed between two frames, which was said to have been one of the special inventions granted by the patent office. This simple compensating tank is filled with water when one of the torpedoes is removed. A hydrostatic piston was attached to the steering engines, but this appliance has been in common use. This piston was said to have been a distinctive feature of the boat. The firm plate of the maker was on most of the auxiliaries, and there appeared no evidence that any of them were special contrivances. There was reason to believe that during the past two years there have been marked improvements in the mechanical details of construction, for numerous changes were pointed out which have proved beneficial.

Previous to the speed endurance trial the Holland had been at the naval academy for about two months. She was probably in as serviceable a condition during the trial as she had ever been before. She had made numerous short runs at Annapolis, and quite a number of the officers of the academy had accompanied Lieut. Caldwell in his dives. Some new castings had been fitted, and, so far as the design and conditions would permit, various adjustments and overhauls had been made. The navy crew of the Holland had a great pride in the boat, and they had done everything that the resources of the academy would permit and their observation would suggest to make the boat more efficient as well as comfortable. Under the direction of the commanding officer of the Holland there had been fitted a grating deck, which was found a very great convenience. If it had not been for this improvement alone it is doubtful if the Holland crew could have stood as long a watch as they did after leaving Annapolis.

From what I saw after nine successive hours of observation, and from an examination of the machinery of the Holland after she reached Norfolk, I am convinced that it was through the skill, endurance and pluck of the commanding officer and the crew of the Holland that the boat performed as well as she did. There were several of the crew, besides Lieut. Caldwell, who were practically on duty continuously for eighteen hours after leaving Annapolis. During that period they had no cooked meals, but ate from a lunch basket, and there was not one of them who could assume even a comfortable position in carrying on his work. The atmosphere was very humid, and with a low temperature there must of necessity have been depressing conditions. The machinist operating the gas engine and the electrician who was in charge of the motors were almost continuously on duty for thirty hours after leaving the naval academy, for during the first three stoppages they had to remain at their posts to make adjustments and to charge the storage battery. Personally, I am satisfied that no civilian crew could or would have done better, and therefore the Holland company could not have secured better results if they had been permitted to send experts on board. In conclusion, I desire that the bureau would express in some official manner its appreciation of the interest Lieut. Caldwell took in securing for the bureau the general information called for.

COLUMBIA YACHT CLUB.

Yachtsmen of the great lakes have reason to feel proud of the Columbia Yacht Club of Chicago. It is the principal club of the lakes, with an enrollment of about 300 members and eighty yachts. The annual election of officers was held a few days ago and Mr. F. H. Osborn, well known in marine insurance circles around the lakes, was unanimously chosen commodore. Other officers are: Vice-commodore H. Aronson; rear-commodore, F. A. R. Moore; secretary, H. P. Simonton; treasurer, W. H. Quinlan. About \$20,000 is now represented in the club house, which will be completed this year, and in a private yacht harbor for which the club has a government permit.

RUSSIAN ARMORED CRUISER BOGATYR.

The Vulcan company of Stettin launched, recently, the Russian armored cruiser Bogatyr, in the design of which there are many interesting features. The vessel is built of the best German steel. The principal dimensions are as follow: Length over all, 134.21 metres (440 ft. 2 in.); length at water line, 132 metres (433 ft.); width, 16.60 metres (54 ft. 5½ in.); depth, 10.40 metres (34 ft. 1½ in.). With complete equipment and 720 tons of coal on board, the vessel will have a displacement of 6,750 tons and a draught of 6.35 metres (20 ft. 10 in.). The vessel has two propellers. Each propeller is worked by a triple expansion engine with four cylinders. The two engines are estimated to develop 20,000 I.H.P. and a speed of 23 knots.

The hull of the ship is divided into numerous water-tight compartments. The middle part of the vessel, in which the engines, boilers, and the ammunition rooms are placed, has a double bottom which extends up the sides to the height of the armor-plated deck. The vital parts of the vessel are protected by an armored deck extending over the whole vessel. The openings in the deck are covered by gratings or water-tight lids. The armor-plated deck has a thickness of 23 millimetres in the horizontal center parts. The sloping parts of the deck have a thickness of 69 millimetres, and of 54 millimetres at the very ends. The armored deck consists of two plates screwed together, of which the upper layer is of nickel steel.

The armament consists entirely of quick-firers. Twelve 15-centimetre quick-firers of 45 calibre lengths, twelve 7.5-centimetre quick-firers of 50 calibre lengths, and six 4.7-centimetre Hotchkiss guns. For the boats and landing expeditions there are one 65-millimetre Baranowski gun and two 3.7-centimetre Hotchkiss guns. There are large ammunition rooms. The ammunition is hung up in cages in accordance with the Russian system. Eight of the twelve 15-centimetre guns are protected by armor-plating. One pair of the 15-centimetre guns are placed aft, and one gun forward in turrets. Four of the 15-centimetre guns, which can be fired broadside and fore-and-aft, are placed in casemates on the upper deck. The turrets of the 15-centimetre guns are protected at the front with an armor of 125 millimetres, and 90 millimetres at the back. The plates, of 125 millimetres thickness, are of hard steel; those of 90 millimetres thickness of soft nickel steel. The ammunition lifts under these casemates are protected by an armor of nickel steel 75 millimetres in thickness. The casemates for the four 15-centimetre guns are protected by nickel steel plates; the front plates being 80 millimetres thick, and the back ones 35 millimetres. The four ammunition lifts to the casemates are protected by 60 millimetres of nickel steel plating. The other guns are protected by armored shields. For the quick supply of ammunition there are the following lifts: Two lifts for the 15-centimetre turrets, four lifts for the 15-centimetre casemates, two lifts for the 15-centimetre guns on deck, three lifts for 7.5 centimetre, and two lifts for 4.7 centimetre ammunition. These lifts can be worked by electricity or hand. The vessel has one torpedo tube in the bow and one at the stern above water. The guns and ammunition, the turrets, as well as their ammunition lifts and turning machinery, also the whole of the torpedo armament, is supplied by the Imperial Russian navy.

For the protection of the commander there is one armored tower on the forward bridge. The armor-plates of the tower are 140 millimetres thick, the protective plate is 90 millimetres thick, and both are of hard nickel steel. The signal wires, etc., running from the tower, are protected by an armored tube.

The vessel has two masts with signal yards. Six search lights are placed on special bridges, two on the forward commanding bridge, and two on a special bridge forward, and two aft. The Bogatyr will carry twenty-one officers, two non-commissioned officers and 550 men, for whom high and airy quarters have been provided. The use of wood throughout the vessel has been cut down to the smallest possible limits. All decks are of steel, and only the exposed ones are planked with teak to protect them from climatic influences. The inner decks are covered with linoleum. Most of the furniture is built of thin steel, also all the cabin partitions. The vessel will be well ventilated, heated by steam, and lighted by electricity. There are four large and two small dynamos driven by steam which supply the power for the electric light, the ammunition lifts, the numerous ventilating machinery, and the six search lights. The steering apparatus, windlasses, boat-lifting gear, pumps, etc., will be worked by steam. The vessel carries two steamboats, one petroleum motor boat, and seven rowing boats. The boats are all built of thin steel, except the small rowing boats. The coal bunkers, which can hold 1,100 tons, are placed partly above and partly below the armored deck. The vessel will therefore have a large radius of action at a speed of 10 to 11 knots.

There are two triple expansion engines and sixteen Normand boilers. The engines and boilers are constructed by the Vulcan works and are fitted with every modern requirement. The moving parts of the main engines are balanced according to Schlick's patent. The boilers work under a pressure of 18 atmospheres. The boiler-room can be put under pressure by special ventilating engines.—Engineering, London.

VESSEL CONSTRUCTION DURING FEBRUARY.

The bureau of navigation reports forty vessels of 12,080 gross tons were built in the United States and officially numbered during the month of February, 1901, as follows:

	WOOD.				STEEL.				TOTAL.	
	SAIL.		STEAM.		SAIL.		STEAM.			
	No.	Gro.s.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Atlantic and Gulf.....	17	2,138	8	329	1	1,120	2	1,854	28	5,441
Pacific	4	3,457	5	1,324	.....	.....	.....	.....	9	4,781
Great Lakes.....	.....	.....	1	1,736	.....	.....	.....	.....	1	1,736
Western Rivers.....	1	24	1	98	.....	.....	.....	.....	2	122
Total.....	22	5,619	15	3,487	1	1,120	2	1,854	40	12,080

MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

Published every Thursday at No. 418-19 Perry-Payne building, Cleveland, Ohio, by THE MARINE REVIEW PUBLISHING CO.

SUBSCRIPTION—\$3.00 per year in advance; foreign, including postage, \$4.50, or 19 shillings. Single copies 10 cents each. Convenient binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

At the last two meetings in New York of the Society of Naval Architects and Marine Engineers, which has met with wonderful success since its organization a few years ago, prizes have been offered for papers on special subjects. One of the members of the society's council has offered a prize of \$100 for the best paper presented in time for this year's meeting (November next) on "Theoretical and Practical Methods of Balancing Marine Engines." This very commendable practice has also been followed by the Institution of Naval Architects, the greatest organization of its kind in the world. It has just been announced by Mr. George Holmes, secretary, of London, that the annual meeting of the institution will take place at the Hall of the Society of Arts, London, Wednesday, March 27, and the two following days, the chair to be occupied by the Earl of Glasgow. It is also announced that the council of the institution will be willing to present a gold medal to any person not being a member or associate member of the council, who shall at the forthcoming meeting read a paper which, in the judgment of the council, shall be deemed to be of exceptional merit. The council will also be willing to present a premium of books or instruments to the reader of any paper, not being a member or associate member of the council, which paper shall, in the judgment of the council, merit this distinction.

The fact that the institution has received and accepted an invitation from the lord provost and corporation of Glasgow to hold its summer meetings in that city on Tuesday, June 25, and that the three following days while the International exhibition is under way, has attracted the attention of shipping interests to the exhibition. An exhibition in Glasgow, the home of ship building, will of course contain in its industrial part much that will prove interesting to ship builders. Great preparations have been made for the exhibition, which is to be opened shortly by the king in person. The site was granted by the corporation of Glasgow and comprises sixty-seven acres of the Kelvingrove park and six acres of the adjoining Bunhouse grounds. It is one of exceptional beauty and convenience. The River Kelvin traverses it and the slopes of Gilmorehill, crowned by the great university buildings, constitute a classical boundary on the north. Seventy-three acres are enclosed—six more than in the exhibition of 1888, which was highly successful. There are four principal divisions—fine art, industrial and applied art exhibits, machinery in motion, and entertainments and refreshments. They are accommodated in magnificent structures, the first in the art galleries, the second in industrial hall, the third in machinery hall and the last in separate buildings, including a grand concert hall. Marine engineering and ship building is represented in the industrial section by the chief builders on the Clyde, the Tyne, the Mersey, etc., and in addition by an extensive loan collection of select models, arranged to show developments in this great industry during the past century. The display also includes models of all the most famous vessels of the world. Messrs. Wm. Denny & Bros., famous Clyde builders, have a reproduction (on a small scale, of course) of their experimental tank, and the waters of the River Kelvin will be utilized for the display of many vessels and models. A specially interesting feature is the exhibit of the Parsons Steam Turbine Co. It is announced that a steam turbine passenger steamer will be running on the Clyde during the summer. During the year, and more or less in connection with the exhibition, there will be a series of gatherings of general interest to those engaged in mechanical and scientific enterprises and studies. These include, in addition to the summer meeting of the Institution of Naval Architects, the congress of the British Association, the Institute of Mechanical Engineers, the Institute of Chemical Industries, the Society of Engineers and Ship Builders, the International Engineering Congress, the Royal Institute of British Architects, the International Association for the Advancement of Science, Arts and Education, etc., etc. Opportunities will be offered to all attending these meetings to visit some of the typical ship building, engineering, steel making and other establishments of the west of Scotland.

The failure of the river and harbor bill to pass the senate must be regarded as a national calamity. To Representative Burton, the chairman of the committee on rivers and harbors, who did the real work, considerable sympathy should be extended. The chairmanship of this committee is an irksome and a thankless job. It means days and weeks of tedious and uninteresting work without reward. The national body is to be congratulated upon possessing a man who is eager to do this work and to do it thoroughly. Burton has a genius for details. The river and harbor

bill was, of course, enormous; but it was no greater than some of its predecessors. The Review does not believe in the cry of extravagance when addressed to the appropriations contained in this measure. It is not extravagance to improve a harbor for the purpose of handling a greater degree of commerce. Such expenditure is the essence of economy. Moreover the bill by no means kept pace in its expenditures with the expansion of the country's trade. The Review regards it as a carefully-considered and conservatively-drawn measure. Nor does the Review join in the popular cry that the defeat of the measure is to be attributed to the opposition of Senator Hanna. Senator Hanna did not oppose the river and harbor bill. He opposed certain of its provisions but not the measure itself. The statement that President McKinley would have vetoed the measure cannot be credited. It would have been very unlike the president to do such a thing.

To those who have been watching the drift of affairs at Washington during the past few weeks it is surprising that the president did not call an extra session of congress when he delivered his inaugural address. All signs seemed to be pointing in that direction. The apparently purposeful neglect of vital legislation, the prolongation of the debate upon the shipping bill, even after it had become clear that it could not pass during the session, the indifference displayed to the most important of appropriation bills—all these indicated that the active workers expected an extra session. No other line of reasoning justifies their apparent unconcern. While extra sessions are customarily called on inauguration day it is not unlikely that one may yet be called. No definite expression can be obtained in Washington, but there are evidences in other places that one is expected. If an extra session is called it will be for the ostensible purpose of providing additional Cuban legislation; the actual purpose, however, will be to pass the shipping bill. The senate, at present in extraordinary session, has already undertaken the task of revising the time-honored rules to limit debate in that body. With this rule amended it will be an easy matter to pass the shipping bill, for it is quite clear that a majority of both bodies favor the bill. Moreover the new congress has a greater Republican working majority than the one which has just expired.

Winter navigation on the great lakes has for years been the dream of inventors who would build great ice crushers, far more powerful than the car ferries that keep a few miles of channel open in the Straits of Mackinaw. Negotiations involving something more than paper plans and models on this score were undertaken by the American Ship Building Co. a short time ago. Officials of the Canada-Atlantic Trans. Co., which operates lines of steamers between Chicago and Parry Sound and between Duluth and Parry Sound in connection with the Canadian railway of the same name, have given considerable study to the question of running ice crushers throughout the winter period between Chicago and Parry Sound. The ship building company submitted plans and estimates on a type of vessel which it was thought might be equal to the task. The matter is still under consideration, but the great cost involved in the experiment is against trial of it.

NAVAL APPROPRIATION BILL.

The naval appropriation bill, as passed by congress, does not authorize the construction of additional ships of war, except three submarine boats, but contains the following provisions:

"That, for the purpose of further increasing the naval establishment of the United States, in accordance with the latest improvements in the construction of ships and the production of armor and armament therefor, the secretary of the navy is hereby directed to prepare the plans and specifications of two seagoing battleships and two armored cruisers, carrying the most suitable armor and armament for vessels of their class and to submit to congress a general description of such battleships and cruisers on the first Monday in December next; and said secretary in preparing said plans and description shall review and further consider the questions whether said ships should be sheathed or unsheathed; what should be the weight and extent of the armor therefor; what should be the form and location of the turrets; whether any changes should be made in the number and kind of guns of the various sizes heretofore constituting the armament of similar ships; what, if any, torpedo tubes should be built into large ships; to what extent electricity should be used for auxiliary purposes, and all other questions which have arisen and are now pending among naval architects and ordnance experts concerning the construction of battleships and cruisers under modern conditions; and said secretary shall, to such an extent as he may deem expedient, report to congress in connection with said description his opinion upon the foregoing questions; and the secretary of the navy is hereby authorized to exercise his discretion as to the sheathing and coppering of naval vessels herein and heretofore authorized to be built."

Manufacturers of boilers who have given some study to the use of economizers will be interested in the announcement that they are becoming quite out of favor in the Russian navy, as they accumulate on their surface so much soot, which, being a bad conductor of heat, diminishes the steam producing qualities of the boilers. To clean this away takes up too much time and trouble, and puts the ship out of line for too long. Moreover, it goes hand in hand with the diminution of the general heating area of the boilers with relation to the number of square feet that go to each horse power. After a searching examination from all points of view into the good and bad sides of fitting economizers, the question has been decided in the direction of their disadvantageousness, and accordingly none will be fitted in ships for the future.

FROM WASHINGTON TO McKINLEY.

A PICTURE OF THE COMMERCE OF THE COUNTRY — WONDERFUL CHANGE IN EXCESS OF EXPORTS OVER IMPORTS DURING RECENT YEARS.

A picture of the commerce of the country from Washington to McKinley is presented in some figures just prepared by the treasury bureau of statistics, which show the imports and exports in each inaugural year from 1789 to 1901. While it is not assumed that the inauguration of a president bears any relation to the commerce of the year in which it occurs the quadrennial events furnish convenient mile-posts by which to measure the development of our commerce since the completion of "a more perfect union." Prior to the complete union of the states under the constitution the records of imports and exports were imperfectly kept and in certain years inaccessible, so that the first accurate reports of the imports and exports of the United States as a nation are for the year immediately following Washington's inauguration, the fiscal year 1790. In the subsequent years the figures are given for the fiscal year in the midst of which the president was inaugurated, while the impracticability of predicting with any considerable accuracy the imports and exports of the present fiscal year renders it necessary to adopt for the closing date of the table the figures for the calendar year 1900. In addition to the statement of imports and exports, a column is presented showing the excess of imports or exports in each of the years named, and a study of this column proves especially interesting as a measure of the development of our commerce and industries. Prior to 1877 all of the years named, with four exceptions, show an excess of imports over exports, while since that time all of the years, except two, show an excess of exports over imports. In general terms, it may be said that prior to 1876 imports almost constantly exceeded exports, and since 1876 exports have almost constantly exceeded imports, while during the past few years the excess of exports over imports has been phenomenally large, being in the calendar year 1900 the largest in our history and reaching the enormous total of \$648,930,329. A still further evidence of the gain which our exports have made over imports in the past few years is found in the fact that in the 107 years from the organization of the government to the inauguration of President McKinley, exports had only exceeded imports by the sum of \$383,028,497, while in the four years since his inauguration exports have exceeded imports by \$2,150,000,000. This remarkable contrast in the figures of the four years under President McKinley as compared with the period of 107 years immediately preceding is accounted for by the fact that in the first three-quarters of that period the imports were much greater than the exports, while the excess of exports came only during the final quarter of that term, thus making the net excess of the entire period less than the average annual excess during the past four years.

The following table shows the imports and exports, and excess of imports and exports of the United States in each inaugural year from Washington's first to McKinley's second inauguration. The figures for the first date named are necessarily those for the year immediately subsequent, and those of the last named date are those of the calendar year immediately preceding; while in all other cases they are for the fiscal year in which the inauguration occurred:

Fiscal year.	Imports.	Exports.	Excess
	Dollars.	Dollars.	of imports (—) of exports (+) Dollars.
a1789 (Washington)	23,000,000	20,205,156	— 2,794,844
1793 (Washington)	31,100,000	26,109,572	— 4,990,428
1797 (Adams)	75,379,406	51,294,710	— 24,084,696
1801 (Jefferson)	111,363,511	93,020,513	— 18,342,998
1805 (Jefferson)	120,600,000	95,566,021	— 25,033,979
1809 (Madison)	59,400,000	52,203,233	— 7,196,767
1813 (Madison)	22,005,000	27,856,017	+ 5,851,017
1817 (Monroe)	99,250,000	87,671,569	— 11,578,431
b1821 (Monroe)	54,520,834	54,596,323	+ 75,489
1825 (J. Q. Adams)	90,189,310	90,738,333	+ 549,023
1829 (Jackson)	67,088,915	67,434,651	+ 345,736
1833 (Jackson)	101,047,943	87,528,732	— 13,519,211
1837 (Van Buren)	130,472,803	111,443,127	— 19,029,676
1841 (Harrison)	122,957,544	111,817,471	— 11,140,073
1845 (Polk)	113,184,322	106,040,111	— 7,144,211
1849 (Taylor)	141,206,199	140,351,172	— 855,027
1853 (Pierce)	263,777,265	203,489,282	— 60,287,983
1857 (Buchanan)	348,428,342	293,823,760	— 54,604,582
1861 (Lincoln)	289,310,542	219,553,833	— 69,756,709
1865 (Lincoln)	238,745,580	166,029,303	— 72,716,277
1869 (Grant)	417,506,379	286,117,697	— 131,388,682
1873 (Grant)	642,136,210	522,479,922	— 119,656,288
1877 (Hayes)	451,323,126	602,475,220	+ 151,152,094
1881 (Garfield)	642,664,628	902,377,346	+ 259,712,718
1885 (Cleveland)	577,527,329	742,189,755	+ 164,662,426
1889 (B. Harrison)	745,131,652	742,401,375	— 2,730,277
1893 (Cleveland)	866,400,922	847,665,194	+ 18,735,728
1897 (McKinley)	764,730,412	1,050,993,556	+ 286,263,144
c1900 (McKinley)	829,019,337	1,477,949,666	+ 648,930,329

a, figures of 1790; b, fractional year due to change of fiscal year from Sept. 30 to June 30; c, calendar year.

In a lengthy article dealing with the performance of the steamers Inhdune and Inchmarlo on voyages between Hartlepool and Dover, Engineering of London shows for them a record of less than one horse power on one pound of coal per hour—to be exact, 0.97 lb. These ships have Mudd's five-crank engines, with cylinder diameters, respectively, of 17, 24, 34, 42 and 42 in., by 42 in. stroke, the high pressure valve being of the piston type, and the others flat valves. Steam at 267 lbs. pressure is generated in two single-ended boilers, with Ellis & Eaves' system of induced draft. Fitted in the uptake, immediately above the level of the highest row of tubes, is a superheater, consisting of a series of wavy tubes through which the steam passes on its way from the boiler to the engine. The steam enters at the top, where the gases are comparatively cool, and passes out of the main steam pipe at the lower end, where the gases are hottest. A temperature of from 460 to 480° Fah. is obtained. Above the superheater come the air heating tubes and casings, which, together with the fans, constitute the induced draft system.

MASTERS AND ENGINEERS OF LAKE VESSELS.

Calvin Co., The, Garden Island, Ont.: Steamers—India, Capt. A. H. Malone, Engineer Thos. C. Smith; D. D. Calvin, Capt. Chas. Coons, Engineer John Kennedy; Chieftain, Capt. John Doyle, Engineer Thos. Gray; Parthia, Capt. David Lefavre, Engineer Geo. Sauve; Johnston, Capt. Ed. Phelix, Engineer Thos. Compeau; Bluebell, Capt. John Dix, Engineer ———. Schooners—Ceylon, Capt. John Ferguson; Augustus, Capt. Jos. Achee; new barge (building), Capt. H. Smith; new tug (building), Capt. ———, Engineer Chas. LeRiche.

Sicken, M., Marine City, Mich.: Steamers—Geo. King, Capt. Wm. Burns, Engineer Peter Britz; M. Sicken, Capt. John Kuhn, Engineer Wm. Sicken; S. K. Martin, Capt. Jos. Sharkett, Engineer ———. Schooners—Teutonia, Capt. Henry Lawrence; Thos. Gawn, Capt. Julius Lawrence; E. J. McVea, Capt. Jos. Chartrau; Clara Whitney, Capt. John Lorenzen; St. Joseph, Capt. J. Millard; Levi Rawson, Capt. Jos. Kobel; Chas. Spademan, Capt. Geo. Gullett; Melvina, Capt. H. Larsen.

Leatham & Smith Towing & Wrecking Co., Sturgeon Bay, Wis.: Steamers—Jos. L. Hurd, Capt. H. L. Wanwig, Engineer Chas. Elliott; I. N. Foster, Capt. Charles Packard, Engineer James Curry; Pewaukee, Capt. Sam Christopher, Engineer M. Holt. Schooners—Advance, Capt. A. Olsen; Alert, Capt. A. Eaverson. Tugs—John Leatham, Capt. Henry Tufts, Engineer Ed. Webber; Geo. Nelson, Capt. James Tufts, Engineer John Riley.

Eddy-Shaw Transit Co., Bay City, Mich.: Steamers—E. C. Pope, Capt. L. A. Miskin, Engineer E. J. Fitzgerald; Selwyn Eddy, Capt. A. J. Mahon, Engineer Robert Leitch; Penobscot, Capt. Geo. E. Stevenson, Engineer John M. Conroy; City of Bangor, Capt. W. H. Moody, Engineer W. L. Sullivan; S. J. Murphy, Capt. Wm. Cavers, Engineer Henry Annett; H. L. Shaw, Capt. John Burns, Engineer S. G. Cowell.

Michigan Central R. R. Co., Jas. R. Innes, Supt., Detroit, Mich.: Steamers—Michigan Central, Capt. A. J. Huntoon, Engineer Alex. Perie; Transfer, Capt. C. B. Crawford, Engineer A. O. Barton; Transport, Capt. Maurice Barrett, Engineer ———; Transport, Capt. Wm. King, Engineer John Cockburn.

Curtis & Brainard, Toledo, O.: Steamers—Cherokee, Capt. J. A. Ward, Engineer E. Toubert; Mohegan, Capt. Wm. Hagan, Engineer Jas. Reagan. Schooners—Chippewa, Capt. John Davidson; Mingoe, Capt. A. Snelgrove.

Dunham, R. J., Chicago: Steamers—City of London, Capt. Wm. Anderson, Engineer J. J. Staley; Ravenscraig, Capt. Samuel Thurston, Engineer E. H. Parry; Black Rock, Capt. J. H. Sinclair, Engineer G. Dawson.

McFall, E., manager, Sandusky & Islands and Erie & Buffalo steamship companies, Sandusky, O.: Steamers—Arroe, Capt. Geo. A. Brown, Engineer Jacob Weis; Pennsylvania, Capt. Harry Tyrie, Engineer Mr. Wells.

Hutchinson & Co., Cleveland: Steamers—J. T. Hutchinson, Capt. J. H. Smith, Engineer C. R. Price; City of Glasgow, Capt. Wm. P. Benham, Engineer W. G. Thorn. Schooner Abyssinia, Capt. T. K. Woodward.

Matthew's Line, Toronto, Ont.: Steamer—Clinton, Capt. John D. Vanalstine, Engineer ———. Schooners—Emerald, Capt. F. McMaster; Grimsby, Capt. Henry Brooks; Clara Youell, Capt. John Boyce.

Chicago & Michigan City Line, E. C. Dunbar, Gen. Mgr., Grand Haven, Mich.: Steamers—America, Capt. John Martin, Engineer A. Vaughan; A. B. Taylor, Capt. ———, Engineer ———.

Warde, John J., 419 Oak St., Chicago: Steamer—Aiko, Capt. Thos. J. Beggs, Engineer Luke Manion. Schooners—A. M. Peterson, Capt. Chas. Bough; J. G. Blaine, Capt. Patrick Meagher.

Young Trans. Co., W. D. Young, Mgr., Bay City, Mich.: Steamer—Arizona, Capt. J. G. Sauer, Engineer ———. Schooners—Scotia, Capt. H. H. Bennett; Plymouth, Capt. T. McCormick.

Lake Ontario & Bay of Quinte Steamboat Co., Kingston, Ont.: Steamers—North King, Capt. John Jarrell, Engineer O. J. Hickey; Hero, Capt. Wm. Bloomfield, Engineer Geo. Boyd.

Thomson Line, C. W. Thomson, Mgr., St. Clair, Mich.: Steamers—City of Holland, Capt. F. J. Meno, Engineer Jos. Meno; Pilgrim, Capt. E. Hayward, Engineer P. Robertson.

Ellis, Chas. H., Managing Owner, Milwaukee, Wis.: Steamer—Hilton, Capt. Manning Kilton, Engineer Sherman Mann. Schooner—Grace Grummond, Capt. Edward Logee.

Spry Lumber Co., John, Ashland Ave., Chicago: Steamer—John Spry, Capt. Frank Elliott, Engineer Gus Gartung. Schooner—John T. Johnston, Capt. John Simington.

Munroe, Thos., Muskegon, Mich.: Steamer—Geo. C. Markham, Capt. Anton Christensen, Engineer A. A. Green.

Ohio Cooperage Trans. Co., Cleveland: Steamer—Monohansett, Capt. D. A. Kendall, Engineer Edward Averill.

McMillan, Hugh, managing owner, Detroit: Steamer—Admiral, Capt. W. H. Rolls, Engineer P. D. McCabe.

Whitaker, Byron, Detroit: Steamer—Byron Whitaker, Capt. Louis Elliott, Engineer D. W. Blauvelt.

Boyce, S. H., Grand Haven, Mich.: Steamer—Mary H. Boyce, Capt. John Tower, Engineer O. Beach.

Ashley & Dustin, Detroit: Steamer—Frank E. Kirby, Capt. A. J. Fox, Engineer H. L. Lewis.

The torpedo boat destroyer Preble was launched this week at the yards of the Union Iron Works, San Francisco. Miss Ethel Preble of Berkeley, a descendant of Com. Preble, officiated at the ceremony. The Preble is 245 ft. on the water line, 23 ft. beam, 8 ft. draught and 420 tons displacement. All the wood work is fireproof. The hull is divided into eighty compartments. The speed is to be 30 knots per hour. The armament consists of two 18-in. torpedo tubes, two 3-in. rapid-fire guns and five 6-pounders. The destroyer Paul Jones is nearing completion and will be launched in six weeks.

HON. PETER WHITE OF MARQUETTE.

HE ENTERTAINS THE CITIZENS OF SAULT STE. MARIE WITH AN ACCOUNT OF ITS EARLY DAYS.

Hon. Peter White of Marquette, Mich., who, some persons insist, is Pere Marquette reincarnate, delivered an address upon the past at the banquet which was given to Francis H. Clergue at Sault Ste. Marie recently. Certainly Peter White was at Marquette before anybody else was and he is there yet. Among many things in his address Mr. White said:

"Men have come to Lake Superior successively for the sake of religion, discovery, furs, iron, copper, silver, silver lead, gold, stone, lumber and timber, fish, scenery and health. They have in the past found them all. The Sault was discovered between 1634 and 1640 by Jean Nicolle. The Christian religion was established at La Pointe by Allouez in 1665, the mission at the Sault dating from 1668. Fur trading was the great business up to 1845, the Astors controlling the business on the American side and the Hudson Bay Co. on the Canadian.

"Chicago is partly built of Lake Superior stone, and our speckled trout and whitefish have been tasted by the epicures of all nations. The lumber is almost gone, careless fires eating almost as much as the hungry axe. The scenery, land and water scape remain, and will remain, and we are still the joy of the seekers for ozone. I might easily spend my time in telling of the growth of that part of our peninsula shore where I have 'grown up with the country,' but I was at Sault Ste. Marie before I ever went to Marquette. It is of this gateway to Lake Superior, through which I passed in a Mackinac boat over fifty years ago, and through which our immense lake navies now pass, that I would prefer to speak, the human interest, locally speaking, seeming to me to be greater on such an occasion as this. In 1837 the white population of Chippewa county was 366, and one Indian was taxed. There were fifty-nine head of cattle, thirty horses, eleven hogs and three merchants. The Canadians were already ahead of us in having some small locks at their rapids. Chippewa county then included three times its present territory. The state of Michigan began a ship-canal in 1840, and was stopped by armed United States soldiers at the point of the bayonet. The very authority invoked to stop this improvement now maintains it, the greatest ship-canal in the world.

"My own first visit to the Sault was in July, 1847. I returned to Mackinac afterward, which was then the great metropolis of this region, but passed through the Sault again on my way to Marquette, as a member of Graveraet's party, in May 1849. Among the business men, merchants, etc., at the Sault we recall the names of Samuel Ashman, Peter B. Barbeau, John R. Livingstone, agent of the American Fur Co., Jas. R. Schoolcraft, sutler of Fort Brady, Stephen R. Wood and Mr. Ord, the Indian agent. It was in this year (1845) that the propeller Independence, Capt. A. J. Averill, was hauled across the portage and launched into the waters of Lake Superior, making her the first steamer placed upon that lake, she being followed in subsequent years, prior to the opening of the Sault canal in 1855, by the side wheel steamers and propellers Julia Palmer, Manhattan, Monticello, Peninsula, Baltimore and Sam Ward, and in which list we must not forget the celebrated propeller Napoleon, she having been converted from a sail vessel into a passenger and freight steamer. The hauling of these boats from the foot to the head of the rapids across the portage, a distance of about one mile, though tedious and expensive, proved a benefit to the inhabitants at large, in furnishing supplies and labor and was one of the causes that induced the majority of the people to regret the building of the canal at that place, as many of them had pictured in their own minds that shipment in all time to come, either to or from Lake Superior, would necessarily have to be transferred at that point by teams or tram railways, and as its volume increased furnish rich pickings to the hotel keepers, merchants, grocers, saloonkeepers and laborers, and up to the date of the opening of the canal that supposition was very largely realized.

"In 1844 and 1845 the large part of the supplies and baggage going on to and off Lake Superior were transported across the portage by what was then known as 'Shel McKnight's old gray horse and French cart,' both of which he had imported from Detroit for the service, and through which he received a far larger rate of compensation per day than is now received by any single drayman at the Sault or any point on Lake Superior.

"Winter amusements were at times of a startling and somewhat exciting character, as for instance, it was understood that the steamer Baltimore was to be hauled across the portage during the winter, and preparations were commenced as far back as in October for the firing of a grand salute on the eve of the New Year from the four cannons that were located upon the high ground in Old Fort Brady, their mouths pointing toward Canada, which, owing to the favorable weather (a regular Lake Superior blizzard) on the night of Dec. 31, 1850, was successfully carried out by the use of safety fuse, cartridges and powder which had been quietly purchased at and brought from Detroit for the purpose, and, on that occasion, used by some of the crew of the Baltimore. The firing of the guns caused intense consternation and excitement among the officers and men of the garrison, as well as the inhabitants on both sides of the river. And here it may be appropriate to say, that while the arrival of the first steamer from the lower lakes at Sault Ste. Marie cannot be definitely fixed, it is supposed to have occurred during the season of 1832. Also, that the steamers Illinois and Baltimore of the McKnight line were the first business boats to pass through the canal east and west bound, respectively. While at Saut Ste. Marie, say from 1846 to and after the completion of the canal, we remember as among the additional business men, James P. Pendill, Louis P. Trempe, Spaulding and Bacon, Albajones, Dr. Wm. Manning, Louis M. Dickens and Mr. Lyons.

"In November, 1855, the new propeller B. L. Webb of Detroit was loaded with mining supplies, principally for the Marquette iron district, and on the passage up, while in shelter at Whiskey bay, took fire, burned to the water's edge and sank, causing the destruction of her entire cargo, which, as there were no other means of communication, it was necessary to duplicate and get the supplies up by water. It was here that the manager of the McKnight line of steamers came to the rescue and, without an opportunity to consult with Mr. McKnight, who was then dangerously ill at Washington, decided to send the propeller General Taylor as a relief vessel to the people of Marquette and other points as far west as Ontonagon, with such supplies as were absolutely required, although this action

involved a large expense and hazardous undertaking, as the crew of the boat would be obliged to remain with her through the winter at such point as she might be laid up. Nor could any insurance be obtained on the vessel or her cargo at that season of year. Consequently high rates of freight had to be charged on the supplies and, as freight was then carried by the barrel bulk and not weight, the rates charged appeared somewhat exorbitant, say to Sault Ste. Marie \$3; Marquette, \$4; Eagle Harbor, \$5, and Ontonagon \$6 per barrel bulk, which rates were freely paid by the people to whom the freight was going, although Mr. P. S. Church of Sugar Island (father of P. M. Church of this city), who happened to have a consignment of stove pipe in his shipment, humorously christened the manager as 'Stovepipe General,' he having modestly charged the pipe at the rate of 50 cents per joint, lake freight. The General Taylor, Capt. Redmond Rider, left Detroit on Nov. 28 (Thanksgiving day) and reached Ontonagon, after various delays, including the getting ashore at Eagle Harbor, on the night of Dec. 9, where she laid up for the winter and returned to Detroit the following spring and, as we have reason to believe, her owners were fairly satisfied, from a financial point of view, with the success of the venture.

"In conclusion, let me say that I have enjoyed more fun in and at the Sault than in any other one place in all my life. People who were in the habit of passing here one way or the other two or three times each year always looked forward to having the funniest time in their lives during the few days they would be compelled to wait for a boat to take them on their journey. There were lots of good, high-minded, honorable people who lived here and a very few of any other kind. But fun was infectious and contagious; it was in the air; every new comer saw that it was necessary to breathe it in and send it forth again in bright scintillations. Today the two Saults are places of great possibilities. There need be no jealousies between them. Whatever benefits one is sure, in a measure, to benefit the other. All that you need on this side is a Clergue to keep the books and manage things. I am grateful that I have been given the pleasure of being with you tonight to meet the distinguished guest of the occasion and rest for a night on the old camping ground. I know of no other place that has so much of the romantic connected with its whole life. Should Sault Ste. Marie increase in population at the same ratio during this decade that it did in the last, in 1910 it will have a population of 20,000. I predict that it will be greater than that and reach 30,000."

MARITIME TRADE OF FRANCE.

The French official trade statistics for the year 1899 have only just been published, and as regards the maritime movement a slight improvement is shown over the previous year. Taken altogether, 47,756 vessels (sailers and steamers), with a total capacity of 29,170,368 register tons, were engaged in the year 1899 in the traffic to and from French ports, viz:

Entries	26,464 vessels of 17,087,465 tons
Departures	21,292 vessels of 12,082,903 tons

These figures, when compared with those for the year 1898, show an increase of 457 vessels and 2,393,895 tons; that is to say, the arrivals were more numerous by 248 vessels (1,083,754 tons) and the departures by 209 vessels (1,310,141 tons). In both directions the increase is divided between French and foreign flags, but foreign flags had the greatest share in it. Indeed, out of the total increase of 2,393,895 tons register only 470,261 tons appear to the credit of the French flag, while 1,923,634 tons of the increase fell to foreigners. As regards the cargoes imported and exported, these amounted for the year to 23,253,823 tons of 1,000 kilogrammes. Of the goods imported, the French flag covered 26 per cent., and foreign flags 74 per cent., while 47 per cent. of the exports were conveyed in French vessels and 53 per cent. in foreign vessels. If, however, we eliminate the maritime operations reserved by law to the French flag (Algeria, Tunis and the deep sea fisheries), only 20 per cent. of the imports and 40 per cent. of the exports fall to the French flag, while foreign vessels come off with 80 per cent. of the imports and 60 per cent. of the exports. With respect to the tonnage measurement of the vessels participating in the French maritime movement in the year 1899, the proportion of the French vessels in the import trade was 28.1 per cent., and of foreign vessels 71.9 per cent. In the latter total Great Britain alone figures for 43.2 per cent. In the export trade the proportion of the French tonnage engaged was 36.6 per cent., and that of foreign tonnage 63.4 per cent.; of the latter total the share of Great Britain is 37.6 per cent. In both the inward and outward movements it will be seen that the British flag covered four-sevenths of the foreign tonnage, but this is a falling off from the previous year, when the British share was 49.86 per cent. On the other hand, the share of the German flag increased from 10.97 to 17.14 per cent. in the inward movements, and from 15.98 to 27.4 per cent. in the outward movements.

In these statistics Marseilles still holds the first position among French ports with respect to the quantity of cargo shipped and landed there, and the other ports stand in the following order: Havre, Dunkirk, Bordeaux, Rouen, St. Nazaire, Nantes, Cette, Bayonne, La Rochelle, Boulogne, Dieppe, Caen, Calais, St. Louis du Rhone, St. Malo, Rochefort.

The amount of freight paid for the transport of goods imported into and exported from France in 1899 is calculated at 447,803,000 francs, of which sum 147,510,000 francs were earned by French ship owners and 300,293,000 francs by foreign ship owners; all through the year, therefore, more than 822,000 francs per day were earned by foreign vessels engaged in the trade to and from French ports.

On Dec. 31, 1899, the French mercantile marine, sailers and steamers combined, comprised 15,489 vessels, measuring 957,756 tons, carrying 81,732 mariners and 7,528 engineers and firemen. There is a falling off here, when compared with 1898, of 126 vessels, but an increase of 57,468 register tons. There was really a decrease of 144 in the number of sailing vessels (in spite of the many large sailers built), but this was partly counterbalanced by an increase of eighteen in the number of the steamers. The number of vessels built in French yards in 1899 was 705 sailers of 53,312 tons net, and forty-eight steamers of 14,964 tons. The vessels of foreign build numbered fifty sailers of 7,092 tons, and forty-eight steamers of 30,795 tons. In conclusion it may be mentioned that the number and the tonnage of French owned vessels have varied but very little during the past ten years.—Fairplay, London.

LIGHTING OF ST. MARY'S RIVER.

While in Washington during the past week Capt. Geo. P. McKay and Mr. C. H. Keep of the Lake Carriers' Association had a meeting with officials of the United States light-house board on the subject of improved lighting of the St. Mary's river. Following is a copy of their request to the board on that score:

To the Light-House Board, Washington, D. C.: The Lake Carriers' Association, comprising the entire freight carrying capacity of the great lakes, urgently calls the attention of the board to the need for improvement in the lighting of the St. Mary's river. It is only a few years ago that vessels commenced running the river in the night time. Since then the vessels have greatly increased in size, and the traffic has more than trebled. In a seven-months season, 25,000,000 tons of freight now pass up and down this river, through tortuous channels where the navigable water in many places does not exceed 300 ft. in width. The size of the vessels is such that the grounding of a vessel in rounding one of the turns in the river is likely at any time to result in a complete blockade of the river, and the actual damage to commerce of such a blockade would exceed \$100,000 per day.

The committee on aids to navigation of the Lake Carriers' Association has carefully considered the needs of the St. Mary's river in the way of additional lighting, and has gone over the matter carefully with the various lodges of the Ship Masters' Association. The results of this examination and consideration are submitted to your board herewith, with the request that in view of the important character of the waterway your board will take the matter up at the earliest possible moment, with a view to the establishment of the new lights during the coming season of navigation. We believe all the additional lighting can be best taken care of by gas buoys properly located. Nine additional gas buoys are suggested, all of them urgently needed in the interest of safety. The locations of these nine buoys, taking them up in the order of their importance, and giving briefly the reason why each is needed, are as follows:

1. A gas buoy at Striblings point to mark the beginning of the turn for up-bound vessels, to replace the private float light now maintained by the Lake Carriers' Association. The present gas buoy at Striblings point marks the beginning of the turn for down-bound vessels, but the turn at this point is a long and gradual one, and in the night time it is essential that up-bound vessels should know when to turn, especially in view of the liability to meet other vessels while rounding the point.

2. A gas buoy at the Dark Hole above Sailors' Encampment. The conditions are similar to those at Striblings point. At present a gas buoy marks the point where up-bound vessels begin to turn. Another buoy is urgently needed to mark the beginning of the turn for down-bound vessels. We think the new gas buoy should be placed on the opposite side from the present buoy and where a black stake is now located.

3. A gas buoy at the head of the Dyke, to mark the upper end of this turn, and to be placed where a red stake is now located.

4. A gas buoy opposite Point Aux Pins light-house, upper St. Mary's river, to mark the turning point in the channel. There have been many groundings at this point, which would be avoided by a gas buoy.

5. A gas buoy at Cedar point, also in the upper part of the run, where the black stake is now located, to mark the northerly limit of the shoal water. Vessels going down this narrow channel are in misty or smoky weather too far from the Brush range point lights to rely upon them exclusively. A lighted buoy in place of the black stake would greatly add to the safety of the channel under such conditions.

6. A gas buoy at the turning point near Round island middle ground in place of the black stake and opposite the gas buoy now located there. The channel is here very narrow, and a lighted buoy is needed to mark the limit of the channel on each side.

7-8. Two gas buoys to mark the northwest and southwest points of the middle ground off Mission point. These buoys are needed for the same reasons given in the case of the Cedar point buoy. The range lights at Birch point are too far away to be exclusively relied upon in smoky or misty weather.

9. A gas buoy to mark Watson shoal, foot of Pipe island, near Detour.

All the foregoing points are sufficiently marked for day navigation. The changes asked for are needed to facilitate the navigation of the river at night. In view of the great magnitude and importance of the navigation of the St. Mary's river we ask from your board early consideration of our request, and as prompt an improvement in present conditions as the light-house board can bring about.

LAKE CARRIERS' ASSOCIATION,

George P. McKay, Chairman Committee on Aids to Navigation.
C. H. Keep, Secretary.

SCHOONER PRESCOTT-PALMER.

Boston, Mass., March 6.—Prescott-Palmer is the name selected for the five-masted wooden schooner to be built by the New England Co. of Bath, Me., for Wm. F. Palmer of Boston, Mass., and to be added to the Palmer fleet, hailing from Boston. The vessel will be 266 ft. keel, 46 ft. beam, 27 ft. depth of hold. She will be of semi-composite type, that is she will have a heavy belt strap 8½ in. x 1 in. let into her frame from the outside and extending all around. To this will be riveted diagonal straps 4½ x ¾ in., extending from the belt strap at an angle of 45 degrees and reaching up to the keel. There will be one of these straps at every frame, and the whole will make a system of intersections forming a most thorough truss for the vessel. The vessel will have Bath Iron Works boilers, Hyde windlass and engines, Warren pumps, an extra steam winch aft, 220 fathoms of chain of 2¾ in. size, built to the standard required by the United States for light-ships, one Balld anchor of 6,000 lbs. and one Camden anchor of the same weight. She will be a complete three-decked vessel with hurricane deck extending forward and aft. Her cabins will be finished in quartered oak and mahogany, with bath-room, hot and cold water, open plumbing and steam heat throughout. The midship house will contain quarters for the second officers. She is specially designed for long voyages. Her capacity will be 4,400 tons dead weight.

One of the double revolving circular sawing machines, made by the Atlantic Works Incorporated, of Philadelphia, was a few days ago delivered to the New York Ship Building Co. of Camden, N. J.

NEW GRAIN ELEVATORS AT DULUTH.

[Special correspondence to the Marine Review.]

Duluth, Minn., March 5.—The concrete grain storehouse of the Peavey Duluth Terminal, which, when completed last fall, broke out with its first storage of wheat, is now about full of grain. The house has been filled gradually and every bin but the three or four damaged by the break is now within a few feet of the top with wheat. There are no signs of a break anywhere. It is stated by the company that the house now contains about 1,000,000 bushels, which is pretty well up to the capacity of the half completed last fall, minus the broken bins and some unfilled spaces near the tops of bins beyond the break. It is evident from this that the difficulty with the concrete structure, as stated in this correspondence at the time of the break, was the "green" condition of the new walls, that had no time to dry before subjection to enormous test. Mr. Peavey has not yet decided as to the erection this year of the remaining half, but is quite likely to build it. The foundations are complete and the forms are ready. Some slight changes will probably be made in the manner of construction.

The 3,000,000-bushel steel elevator of the Great Northern road at the head of Lake Superior, West Superior, is completed, and some of the machinery is being tested. The elevator has been under way for nearly three years and no cost has been spared in its erection and equipment. It is claimed to be the most complete structure of its kind in the world. It is said to have cost not far from 75 cents a bushel capacity.

Nye, Jenks & Co. of Duluth, under the name "Rialto Elevator Co.," have let contracts for a large elevator of steel and concrete on the Calumet river. It will be of the Macdonald patents, similar in some respects to the elevator of the Iron Elevator & Transfer Co. of Buffalo. It will differ from that in size, and in the fact that the house will be raised on steel posts, instead of on the ground. There will be absolutely no wood in the structure, even the frames of the machines being of steel. The estimate of cost is about 30 cents a bushel capacity, a very remarkable figure, and no more than wood costs. In this structure the bins are steel cylinders, the circle being composed of six plates bolted together in vertical lines. The point of junction of each plate with the next is also its point of junction with the two similar plates of the adjoining bin, thus giving a vertical bolted beam, four times the thickness of the plate, at each of the six points of contact of the cylinder with other cylinders. The concave triangles between the cylinders will be used for storage, for machinery, for stairs or elevators, and for other purposes. The ground floor will be concrete set between masonry arches. A man on the bin floor will see and handle all the machinery. The single upper floor at the top of the bins will also be concrete. The bins will rest on steel, concrete-covered posts and the car tracks in the building will be protected by a thorough system of automatic sprinklers. This house will hold 1,000,000 bushels.

There are now in store at Duluth-Superior about 14,000,000 bushels of grain, of which about half is wheat, and more than half the rest is corn. There is an average weekly increase now of about 400,000 bushels, mostly corn. A large quantity of this grain is expected before the opening of navigation, and there will probably be as much grain tonnage to be moved from Duluth in the spring as a year ago, if not more. There are now 1,500,000 bushels more grain than a year ago. Some wheat will probably be taken all rail at once, but the amount has been grievously overstated and cuts no great figure. Charters for spring delivery are not being made yet in quantity, though a few are closed.

FISHERIES OF CANADA.

John L. Bittinger, consul general at Montreal, writing to the state department regarding the fisheries of Canada, says:

"The fisheries industry is one of great importance in the dominion. The amount of capital invested in the industry last year exceeded that of the previous year by \$289,743, and 719 more men were engaged in the work. No less than 79,863 men were occupied in 1900 in exploiting the waters of Canada, using 5,506,760 fathoms of nets and other fishing gear, representing a capital of \$10,000,000. The salmon preserving industry of British Columbia, comprising sixty-nine canneries and representing a capital of \$1,380,000, gives employment to 18,977 hands. The total catch of fish in Canada for the year 1899, as reported by the fisheries department, amounted to \$21,891,706, being an increase of \$2,250,000 over the yield of the previous year. The catch for the province of Quebec was worth \$1,953,134, an increase over the preceding year of \$191,694. The lobster plant alone is estimated to be worth \$1,334,180. It comprises 858 canneries, dispersed on the seaboard of the maritime provinces. The sealing fleet last year numbered thirty-seven vessels, an increase of eleven over the previous year and representing an aggregate of 2,641 tons register. The total number of fur seal skins taken by Canadian sealers during the year 1900 was 35,523. This result is larger by 177 skins than that of 1899, which in its turn largely exceeded the catches of 1898 and 1897. Although the catch of 1900 is slightly in excess of that of 1899, the average catch per vessel would show a falling off if comparison were confined to these two specific years. Manufactured seal skin goods have largely advanced in price in the Montreal market, and the profits of retail dealers are said to be very high. They can be purchased in the United States quite as cheaply as here, for the reason that retail dealers there are content with smaller profits. So far as can be learned there have been no complaints of transgressions of the law or regulations by the sealers last year; nor have any complications arisen through the application of the law affecting the business."

A Philadelphia dispatch says that the announcement has just been made that the Manchester Line (Ltd.) of Manchester, England, and the Leyland line of Liverpool, have concluded arrangements to jointly establish a regular service between Philadelphia and Manchester. It will be operated as the Philadelphia & Manchester Steamship line, under the auspices of the Manchester Ship Canal Co. and the Reading Railway Co. and its connections. The first sailing will take place in the first week of June. Charles M. Taylor's Sons will be the general agents in this country and the Reading's Port Richmond piers will be used by the vessels of the line.

The Toronto Board of Trade and other commercial bodies of Canada are urging the government to abolish tolls on grain passing through the Welland canal.

A STATEMENT FROM CONGRESSMAN BURTON.

Just before leaving Washington for Florida and Cuba, where he will seek rest after months of arduous labor on the river and harbor bill, Hon. T. E. Burton, chairman of the house committee on rivers and harbors, gave out a formal statement regarding the defeat of the bill. Mr. Burton with several other members of the committee will inspect the ports of Jacksonville, Tampa, Miami and other places on this southern trip. Before returning it is the intention to visit Key West and Havana. About four days will be spent in Cuba. Already the committee has perfected plans for a trip to California in June. It is the intention to go by way of New Orleans and Galveston, inspecting southern ports, and to return by a northern route, after having visited all of the large cities on the Pacific coast. There is, of course, no rivers and harbors committee at present because the committees of the new congress have not yet been appointed, but all of the members who will go on these trips have been re-elected, and will undoubtedly remain on the committee. Mr. Burton's statement is as follows:

"I feared as long ago as Dec. 1 that the river and harbor bill would fail. Several indications developed then that caused apprehension. In the first place, it was inevitable that the bill would be large. Provision had to be made for the Mississippi, for which no appropriation had been made in river and harbor bills since 1896. Then pressing demands were made for the improvement of the southwest pass at the mouth of the Mississippi. After making provision for the southwest pass, or outlet, of the Mississippi river and then for the main stem of the river on a basis of the average appropriations for ten years back, it was necessary to appropriate or authorize \$15,000,000 for this stream alone. In numerous other places in the country there was a pressing demand for improvements because of the increase of traffic, and the increase in the size of boats used in the carrying trade, manifested particularly in the increased draught of vessels in the Atlantic carrying trade.

"The large size of the bill made it certain that those of an economical bent would watch it with some apprehension, and then noticeable danger arose from the large number of surveys and estimates for improvements which have received a favorable recommendation from the war department and for which there is a very strong pressure both in the house and senate. Some of these projects are objectionable and not only would involve a very large expenditure but would establish precedents that would prove very troublesome in the future. Another thing that caused apprehension was the increasing disposition to place on the river and harbor bill items that clearly did not belong there, such as for reservoirs and arid lands, the reclamation of the Potomac flats and other improvements which are not for the sake of navigation. The house committee endeavored as far as possible to keep out these extraneous improvements. Then, too, the bill did not pass the senate until four days before the expiration of the session and, as it passed, it contained 299 amendments to the house bill.

"In order to perfect a river and harbor bill after it has passed the two houses it is necessary to go over it very carefully in conference. There should be at least a week or ten days available for consultation. It became evident about Feb. 1 that the measure would not pass the senate until late in the session. Thus my disappointment at the failure was very much diminished, because that result had been anticipated. The bill was evidently held in the senate until very late, it is claimed by some with the object of forcing the passage of other measures, in support of which there was less unanimity.

"The results growing out of the failure of the bill cannot be otherwise than serious. In the case of many harbors and channels the funds required for dredging and other improvements classified under the head of maintenance, are nearly exhausted, and in some localities no harm will result except from the cessation of needed improvements. In other places the maintenance of present facilities for navigation will be very difficult. We can only hope that the damage to commercial interests will not be as great as now anticipated. Had there been a rule for closing debate in the senate it would undoubtedly have been applied, as nine-tenths of the senators would no doubt have voted for the bill, and would have consented to the striking out of the items objected to by the conferees of the house rather than to lose the bill. An analysis of the remarks made against the measure in the senate does not seem to show any great familiarity with the projects under consideration. The bill in 1896 carried many millions more, and the claim of extravagance cannot justly be charged against the bill that just failed. In 1896 the treasury was almost bankrupt and the country was in a state of serious financial and commercial depression. If the bill of 1901 was large it is an unanswerable argument in reply that river and harbor appropriations have not increased of late years as rapidly as the trade and transportation of the country or the country's wealth."

DEATH OF CAPT. JAMES MOFFAT.

Capt. James Moffat of Port Huron died last week. He was a native of Scotland, but at an early age his parents went to Canada, making their home at Sarnia. He became identified with the early shipping of the great lakes. When a mere boy Moffat was employed by one Cameron to row one of the skiffs on the river, which constituted the only ferry between Port Huron and Sarnia. Later Moffat bought a skiff out of his earnings and started an opposition line. He soon captured the trade, after many a fierce battle, and held it for years. Everyone who had occasion to cross the river knew "Jimmie" Moffat. In 1857 Moffat branched out and bought a scow and with a team of horses and treadmill he economized his physical powers. The scow was propelled by paddle wheels. Later he built a little boat called the Union, propelled by steam. She was the wonder of the river, being the first of its kind. The Union was afterward sold to Saginaw parties, and Moffat with others built the ferryboat Sarnia, which had the route for many years and was considered a model vessel of its kind. Eventually Moffat drifted into the tug business, having made good money at the ferry business. He owned the tugs Kate Moffat, Brockway, Frank Moffat, Mocking Bird, and later purchased the Grace Dormer, which was rebuilt and placed on the ferry route. The Beckwith was also purchased by Moffat and he organized the Port Huron & Sarnia Ferry Co.

Capt. Sidney G. Millen has resigned the position of inspector of hulls at Detroit to become the captain of the steamer Iron King.

ORIENTAL EXPORTS SERIOUSLY AFFECTED.

Hostilities in China have seriously affected exports from the United States to that country. In the seven months ending with January, 1901, the total exports from the United States increased more than \$100,000,000, or about 13 per cent., as shown by the reports of the treasury bureau of statistics just issued, while to China alone the exports from the United States show a fall of more than 50 per cent. In practically all of the articles other than those required by the troops now in the field in that country, there is a marked decrease, while in a few articles, such as telegraph instruments, flour, bacon and hams, butter and cheese, there is an increase. In such important articles as cotton cloths, illuminating oils, cars and carriages, bicycles, builders' hardware, lumber and furniture, which enter into the daily requirements of the life of the people of China, the reduction is very strongly marked. Cotton cloths, for instance, show a reduction from 115,993,840 yards in seven months of the fiscal year 1900 to 21,476,080 yards in the same months of the fiscal year 1901. Mineral oils show a fall from 16,030,966 gallons in seven months of the fiscal year 1900 to 9,492,366 gallons in the corresponding months of the present fiscal year. Builders' hardware shows a fall from \$28,539 to \$16,347; cars and carriages from \$14,991 to less than \$1,000; clocks and watches from \$12,560 to \$4,336; and manufactures of tobacco from \$261,782 to \$180,121.

In other parts of Asia and Oceania peculiar circumstances also result in an adverse showing in the exports of the fiscal year up to this time. The exporters to the Hawaiian islands have refused, since those islands became a part of the United States, to furnish to the collectors of customs the usual statements of exports, and as a result the bureau of statistics is unable to make any report of the exports to the Hawaiian islands which presumably amount to more than \$15,000,000 per annum, as they had reached that sum prior to annexation, and were showing a rapid increase when the reports terminated. This will cause the exports to Oceania to fall fully \$15,000,000 below the actual amount, since the existing law provides no method by which exporters can be required to furnish a statement of their exports from one port of the United States to another. Other circumstances are causing the figures of our exports to Japan to fall in the fiscal year 1901 below those of the preceding year. This is due entirely to the fact that Japan imported such large quantities of cotton from the United States in the fiscal year 1900 that she requires but little at the present time, and our exports of raw cotton to Japan in the seven months ending with January, 1901, amount to only 5,520,865 pounds, against 93,037,286 pounds in the corresponding months of the preceding fiscal year, thus causing a reduction of more than \$6,000,000 in the single item of cotton exports to Japan. These three peculiar circumstances—the reduction of exports to China by more than 50 per cent.; the reduction of cotton exports to Japan amounting to over \$6,000,000 in seven months' time, and the inability of the bureau of statistics to present the figures of our exports to Hawaii, which have doubtless amounted during the seven months of the fiscal year to nearly \$10,000,000—must have a marked effect upon the export figures to Asia and Oceania, and it is not surprising that the figures of the bureau of statistics show an apparent reduction of \$15,000,000 in the total exports to Asia and Oceania in the seven months ending with January, 1901, as compared with the seven months ending with January, 1900, when China and Japan were taking their full quota and when the exports to the Hawaiian islands were being recorded.

AROUND THE GREAT LAKES.

Capt. John J. Burns has been reappointed harbor master at Buffalo for a term of two years.

Including the steamer Lansing and schooner Twin Sisters, purchased a few days ago, J. C. Gilchrist of Cleveland has forty-seven vessels.

Capt. M. Mulholland of Cleveland, who has been meeting with marked success in the sale of his patent hatch fastener, has started east and will visit all the ship yards of the Atlantic seaboard with a view to introducing the device on seagoing vessels.

The fourth of the ocean-going steel steam vessels of the Northwestern Steamship Co. (Charles Counselman and others) was launched at South Chicago this week. She will ply between South Chicago and Liverpool and Hamburg. This vessel, alike to her sister ships, is 242 ft. in length and 42 ft. beam. She was christened the Northtown.

Sales of vessel property reported during the past few days: Steamer Lansing from Whitney Trans. Co. of Detroit to J. C. Gilchrist of Cleveland; schooner Twin Sisters from Capt. Ben. Boutelle of Bay City to J. C. Gilchrist of Cleveland; Canadian schooner Garden City from Capt. Thos. Nihan to the Niagara, St. Catharines & Toronto Ry. Co. of St. Catharines; schooner Ida Keith from Messrs. Richardson and Gaskin of Buffalo to Capt. Homer Warren of Detroit; barge Allegheny from P. C. Smith to E. T. Carrington of Bay City.

A wooden tug building by Burger & Burger of Manitowoc, Wis., for the Chicago Lumber Co. of Manistique, Mich., is well under way. Her engine is to be an 18x20, and will swing a Sheriff's wheel of 5 ft. 5 in. diameter. The engine is of Buffalo manufacture. In addition the firm has contracts for two fishing tugs. One of these will be built for Borkenhagen, Mader & Scheerer of Kenosha, who own the Fred Engel. She is to be 72 ft. long, with 15 ft. beam and 7½ ft. hold. Her engine, a 14x16, will be built by the Sheriffs Manufacturing Co. of Milwaukee, and Hess of Manitowoc has the contract for the boiler, 5½x11 ft. The second tug is for a fishing firm at Manistique, Mich. She will have a length of 75 ft., with 17 ft. beam and 8 ft. hold.

Wm. H. Meyer of Milwaukee, representing the Milwaukee Tug Boat Line, has been figuring for some time past with the American Ship Building Co. for the construction of a large steel freight steamer and finally closed a contract for the vessel a few days ago. It is the intention of Mr. Meyer and his associates to have built a second steamer of similar size, but the contract may not be let until late in the present year. This steamer is to be ready for business about the middle of October. She will have a keel length of 394 ft., a length over all of 414 ft., 48 ft. beam and 28 ft. molded depth. Her power will consist of a triple expansion engine with cylinders of 22, 35 and 58 in. diameter and 40 in. stroke. Three Scotch type boilers are to furnish steam. Command of the vessel will be given to Capt. William E. Wright of the steamer Helena, and Scott Pratt, also of the Helena, is to be her chief engineer.

LOADING A BIG OCEAN FREIGHTER.

(From the New York News.)

Much care has to be taken in the loading of ocean steamers, and the work of the stevedore might well be classed as one of the fine arts. Many untoward things can happen on the way across, and various precautions have to be taken for safety and economy—the pianos must be so stored as not to get abroad and roll around loose in among the baby carriages; the apples and hops must be placed where they will not give an undesirable flavor to the butter, lard and other foods, and, of all things else, the tons of grain in the hold must be packed firmly and securely, lest a shift in a storm send the ship to bottom, or at least give her a list that will make much trouble.

A visit to one of the wharves where the work is done brings out many details that one never dreams of by the mere reading of published figures of the immense increase in our exports. Indeed, one may regard himself as lucky if he reaches the wharf during busy times without getting run over by one of the many trucks that haul the freight to the ship. Out of what at first seems bungling confusion, however, one soon becomes aware that there are systems and heads of systems, and uncommon care and order withal. From the midst of the din and confusion one man seems to stand out among the rest as the person of whom everyone is asking questions. The reporter followed suit, and when the boss stevedore got around to it he led the way to his office. Showing a sectional view of a steamer, he said:

"Here is kept a record of everything that goes aboard," and he pointed to sections set apart, with the number and contents of cases, bags and barrels marked in. "Part of the cargo I can place in advance, and know just where it is going, but often I have to make changes, either from the delay in arrival of certain freight or delay in loading. There is the ship as she is. Now come out here and see how it goes on.

"It is not only the matter of placing the various consignments, but keeping everything on the move," he explained. "When a ship has been scheduled to get away on a certain tide, and there is just about so much time to get things aboard and patched up, and the cattle all on, there's no loafing for any of us. But this steamer here," he went on, nodding to the great ship that stood sides high on the flood tide, almost closing out the light from the wide doorways, "has been in only a little while, and it gives you a chance to see the unloading and loading at one time. From some of the hatches they are taking out freight, and at others putting it in. What comes from the other side doesn't amount to much by comparison with what we ship over. And these piles of freight, for the most part, are on the way out. In short, it is what we call miscellaneous cargo—manufactured goods, food products and some lumber, cases, boxes, tierces, bundles, pails and sacks.

"The space required by each of these various pieces we come by constant handling to know without any measurement—the weight and displacement. Once in awhile some new shape or size of case or bundle puts in an appearance, and we have to measure it, like these bundles of sticks used for dowels," and he pointed to some long, small round pieces of wood that were tied up in rolls. "Now, when such stuff as that, for instance, comes along we have to measure it and get its displacement and compute from one what the whole consignment will take. As we know the tonnage capacity and the room, we can arrange matters accordingly. We regard 200 sacks as a unit. These, we know, weigh 28,000 lbs. and take up 700 cu. ft. In most cases we can handle a unit of these, and, once ordered, there is so much out of the way. A tierce of lard occupies about 14 cu. ft., a box of bacon 16 and a roll of paper 90 cu. ft. for every ton, and, with paper in the case, 40 cu. ft. for every ten cases. Oats run 65 cu. ft. to a ton; wheat, corn, barley or flaxseed 43.

"Knowing the estimated weights as they run, we can tell where we are at any time. And, as the loading proceeds we are posted from the men below decks as to how the space is running, usually measure by so many beams, forward and aft measure, and so high—occasionally 'man high.' In that way we get a pretty fair estimate of room.

"And then," he continued, going around the pier to where there was a good view of the stern of the ship, "it is well to keep an eye for the balance, to see that she doesn't get a list on. When a ship gets in we are told just how she stands with the coal there is in her, and from that we, to a certain extent, can determine upon the makeup of the cargo. If the starboard or port bunkers are either of them pretty well filled, we counter-balance with the cargo. And, while you will see that, in loading up, it is the practice to let down the cargo, alternating from one side to the other, there are exceptions. When weight of one class of cargo is unequal to a lot on the other side, either at some immediate or distant part of the vessel, we keep our eyes out for any overloading on either side."

About the great openings, gangs of men were at work either receiving the miscellaneous cargo from the ship or preparing loads to be drawn up the heavy, smooth planks and lowered into the hold of the vessel. It becomes evident at once that business is done on the wholesale plan as far as is possible. In loading the pails and smaller boxes a number of the pieces are packed into large boxes about the size of a gravel scoop, and trundled on to a truck to one of the mouths of the shed, there to await their turn. The men work for most part in gangs of four, and there's not a man of them that won't tell you that it is mighty hard work.

"One of these boxes," said one of the men, pointing to a lot of lard pails, "weighs about 1,400 lbs. Now, in the winter we don't mind working, and it's only a matter of keeping on the move so as to be warm. But in the summer time—" and the wharf hustler looked tired at the thought. In time the hoist was ready, and slowly was drawn up the plank, with one of the men before and one behind to see that nothing got adrift. The bags of flour—flour is never shipped abroad in barrels—are hoisted up much the same way, only in their case there is no need of any boxes, as the sling is thrown around a lot, and they are thus kept together. One of the men seats himself upon the pile, and up they go. One wonders what he could do if anything did loosen, and sees, as part of an answer, that the man is very much in use at the top of the trip, and steadying the load forward to the deck crew. The men who do this general work about the wharf get paid by the hour, and, when business is rushing, of course, do well. But business doesn't keep rushing, they say, and when the end of the week comes around it has averaged up probably \$8 or \$9. It gives one of the men at work upon the wharf evident pleasure to call attention to any of the freight that may show damage. The chances are that it is

not "on him," for the damage probably resulted from improper storage, either on the railroad or the steamer.

"That often happens," said one of the freight handlers, when his notice was called to two large barrels with their heads broken in, and the skins that had presumably once been packed nicely within crowding out through the upper end. "They don't know how to store stuff as well on the other side as here," he went on, "but there is some reason for things getting adrift sometimes. You see, there being so much less coming this way than going over, it is harder to make good storage of it, and in spite of the best they can do it will get loose in the heavy thrashing around that comes from a big storm." Incidentally, he remarked that of late there had been much more damage of this sort than usual, because of the many heavy gales that incoming steamers have encountered. In all of the seven hatches of the vessel there was something either going in or coming out, and there was no end of noise from winches, ranking away at one or another of the hatches.

"Can you go below? O, yes. But look out and don't fall and break your neck." The warning is hardly necessary to one who looks down the 40 ft. to the bottom of the hold—a fall that, by the way, comes to many an unfortunate man at work about the hatch. There is something of a reach down over the iron ridge of the upper hatch to the upper rung of the ladder leading down to the first, or "between decks," and again the same backward stretch to the ladder running to the orlop deck, and again to the deep hold. It was there learned by a short experience that the floor of a steamship hold is very likely to be slippery, and the writer narrowly escaped a fall. The work went steadily on. Only at intervals would come the whack of a sling that had just been unloosed from one of the loads, and was sent down again to harness in two more pieces. What with the smell of pitch there was nothing attractive about that hold, and the next one aft was visited, after a climb up to the orlop deck, and a walk through. There was a sample case of grain in the hold, with room left according to law for storage at least five rows deep of grain in bags, or the equivalent in weight. The object of this is to prevent the grain from shifting, for, even if filled in to the top, after out a ways the grain would settle ordinarily, and leave room for shifting, in spite of the center-boards which run fore-and-aft the ship, in the hold, to counteract, as far as possible, the lateral movement of the grain. The only alternative for this, one of the men explained, was to provide boxes filled with grain and set in the deck above, which as the grain settled below, might supply the deficiency and thus prevent the shifting when under way. In place of the stipulated "five rows of grain bags," the grain that had been put in was covered over with some of the cargo lumber, and on these boards were placed some rolls of paper to fill in right up to the deck above.

In another of the holds the work had progressed so far that much of the so-called lighter cargoes were being put in, bales of hay, patent medicines, furniture stock, and what not. In still another a grain nozzle was feeding the hold with corn, and, the corn being dry, there arose a cloud of dust that floated out far across the docks. In the after hold of all, a cargo of chalk from England was being hoisted out in great buckets and dumped into one of the lighters, to be made finally into whiting—one of the lighters that the water-front people call the "express wagons of the harbor." So the work goes on. It requires two or three days to unload and load one of the 10,000 or 12,000-ton ships that come into New York. The heaviest cargo goes into the hold, as a matter of stability. It does not necessarily follow that the cargoes forward and also aft shall be light, as all that depends upon the form of the vessel. Some can stand, and sometimes, in fact, require, that the stern or the bow be well set down. And when all the merchandise has been taken aboard, it is the turn for the cattle and horses. The former are punched or prodded, but not violently, to make them proceed, while the horses are led aboard. And when all is ready, except some work that can be done by carpenters who can come back on one of the tugs, the great carrier is coaxed out into the harbor, and thence moves majestically off to sea.

A SURPRISING INTERVIEW.

A newspaper dispatch of a surprising nature has just been sent out from Philadelphia. It purports to be an interview with President Mathias Seddinger of the Neafie & Levy Ship & Engine Building Co., upon the seaworthiness of torpedo boats. This firm is now building three for the United States navy, which are about to be launched. It was at one time the intention to launch them all together, but it now appears that this will not be done. Asked regarding the determination of the company to leave two of them on the ways while one is being launched, President Seddinger is reported to have said:

"Well, the point is we want to see how the things behave before we put them in the water. They are built like a watch with the closest calculation and utmost care, and if the slightest thing goes wrong they will sink. They are very light and the load they are to carry is exceedingly heavy. They are to make a speed of at least 29 knots on the trial and to accomplish that the engines will have to do their best. I do not say that I expect them to sink, but I do say that the slightest break, the displacement of a single pin in their delicate machinery will send them to the bottom with all aboard. I know I would not risk my life going on the trial trip."

LENGTHS OF TWO SIX-MASTED SCHOONERS.

Editor Marine Review: One reading your article of Feb. 7 on the two six-masted schooners, Eleanor A. Percy and George W. Wells, would get the impression that the Wells is the larger of the two. The Percy's keel is 1 ft. 4 in. shorter than the Wells, but the Percy, having more overhang, makes her the longer vessel. A yacht when measured for length is not measured on the keel; if so, some of the largest boats would be in the canoe class. How can there be any controversy in regard to the size of the two vessels, the Percy being 3,401 and the Wells 2,970 gross tons. The Percy has carried 5,514 tons of coal and the Wells has yet to carry 5,000 tons. Not so very long ago the same controversy arose over the Bean (five-master) and the Palmer (five-master). When measured there was a difference of 14 tons, surely a chance for controversy. The very papers that claim the Wells to be the longer vessel because her keel happens to be 1 ft. 4 in. longer forget that they claimed the Prescott with a keel about 10 ft. shorter than the Palmer to be the longer vessel, because of her being so over all. Is this consistent?

Bath, Me.

HENRY MALMSTEN.

TRADE NOTES.

The American Bridge Co. will furnish the steel work, amounting to 3,000 tons, for the new Astor building, at the corner of Fifty-fifth street and Fifth avenue, New York city, and also about two thousand tons of the same class of work for the new custom house in New York city. The new Liberty street bridge to be built by the Pennsylvania Railroad Co. at Pittsburg will also be furnished by the American Bridge Co.

A third edition of Walter B. Snow's lecture on "The Influence of Mechanical Draft Upon the Ultimate Efficiency of Steam Boilers" has just been issued by the B. F. Sturtevant Co., Boston, Mass. It treats of the different methods of application of fans for producing boiler draft, of the relative cost as compared with a chimney, of the possible economy in first cost of boilers, running expense for fuel, etc. Copies may be obtained upon application.

Following are sales reported recently by the Bullock Electric Mfg. Co. of Cincinnati: Carnegie Steel Co., Pittsburg, 25 H.P. type H motor; Glasgow Evening News, Glasgow, Scotland, three motor generators; London Daily Express, London, Eng., three motor generators; Montreal Water & Power Co., Montreal, 400 H.P. three-phase motor; Aberdeen Journal, Aberdeen, Scotland, one 30 H.P. Teaser equipment and one motor generator; Greuner & Co., Johnstown, Pa., 30 K. W. type I generator; Brown & Sharp, Providence, R. I., four type N motors for direct connection to machine tools; Wier Frog Co., Cincinnati, three 10 H.P. type N motors; Pullman Co., Pullman, Ill., two 150 K. W. type H generators; Mosler Safe Co., Hamilton, O., 50 H.P. type H motor; Susquehanna Valley Electric Co., Sidney, N. Y., 65 K. W. single-phase generator; Central Lard Co., New York city, 65 K. W. engine-type generator; Buffalo Evening News, Buffalo, 70 H.P. type H motor.

Special agents, delegated to look after the marine trade, are being appointed at some of the leading shipping points by the Philip Carey Mfg. Co., one of the largest of the concerns engaged in the manufacture of boiler and pipe coverings. The main offices and factories of this company are located at Lockland, O. They have branch offices in New York, Chicago, Philadelphia, Pittsburg, St. Louis, Cincinnati, Buffalo, Baltimore, Boston, Cleveland, Atlanta, Charlotte (N. C.) and Minneapolis. As showing the rush of business upon which this company has been engaged, the following extract is made from a letter of recent date: "We last summer commenced the manufacture of 85 per cent. carbonate of magnesia pipe and boiler coverings at our eastern plant, and contrary to our expectations, the plant was far oversold within a very short time, the demand for the goods as soon as they were introduced having far exceeded our expectations. We still have on hand a number of very large contracts, and really do not care, under the circumstances, to actively solicit new business until the deck is clear and we shall have had an opportunity to accumulate a stock of magnesia coverings at our factory and numerous branch offices. We are now making very good progress in this direction. Among marine interests we have, in addition to various large contracts

and orders for the New York, Boston, Mare Island and Portsmouth navy yards, also closed and are now working upon contracts with a number of builders of government ships, and also with the American Ship Building Co. of Cleveland."

CONDITION OF ICE THROUGHOUT THE GREAT LAKES.

Detroit, Mich., March 6.—Norman B. Conger, marine agent of the United States weather bureau at this point, has collected from agents of the weather bureau in all parts of the great lakes reports regarding ice conditions and has issued the following summary:

"Reports from the regular and display stations of the weather bureau on the great lakes indicate that on Lake Superior the harbors are frozen solid, and solid ice extends out around the Apostle islands. At the extreme western end of the lake the ice belt is only about eight miles wide; beyond this belt there is open water with ice fields moving to and fro with the wind. On the eastern portion, the lake appears to be open. The ice in St. Mary's river is solid to Frying Pan island, but below that point there is open water and no ice visible in Lake Huron. In Lake Michigan the ice appears to be firm over the extreme northern portion and Green bay, while on the west shore from Algoma south to Chicago there is very little if any ice. On the east shore from Muskegon south to St. Joseph there are large ice fields which move slowly with the wind, and block the harbors at the present time. The reports from Lake Huron are meager, and indicate but little ice in the lake. The large field at the southern end of this lake was broken up by the high winds of March 3, but this field probably moved south under the high northerly winds that has followed and may possibly cause a pack and bridge at the mouth of the lake. In Lake St. Clair the ice is firm and of greater thickness than has been reported for several years. The Detroit river is full of ice, which is broken up where the ferries keep an open channel. In Lake Erie the reports indicate the harbors on the south shore frozen solid from Fairport to Buffalo, with the ice field extending beyond vision. Open water is reported off Sandusky harbor. There is but little ice reported in Lake Ontario except at the extreme eastern end, where the ice apparently extends from shore to shore. There are no large fields of ice reported over the central portions of Lake Ontario, but the harbors are frozen solid."

The launch of the battleship Ohio at the Union Iron Works, San Francisco, will be a matter of considerable importance. President McKinley has definitely decided to attend, as will also the governor of Ohio if his health permits. The Ohio delegation in congress met in Washington on Monday evening and decided to go in a body. They will undoubtedly join the presidential party at Columbus and the trip across the continent will be made together. San Francisco is already preparing to entertain the distinguished guests. The Ohio is a sister ship to the Maine and Missouri.



"Little Giant" Drill in Close Quarters.

MADE IN SIX SIZES.

ONE HOUR'S TRIAL

is better than a thousand testimonials. We offer a 30 days' free trial of any "Little Giant" Tool you may select—you simply send it back if you don't want it and we "pay the freight" both ways.

"Little Giant"

PNEUMATIC TOOLS

have won and are every day winning through performances, not promises. Their strong hold on the favor of good mechanics lies in the fact that they never disappoint. Our "Little Giant" Piston Air Drill has repeatedly demonstrated its superiority in competitive tests. It is the only Piston Air Drill having a double-balanced Piston Valve cutting off at $\frac{5}{8}$ or full stroke, and it does its full duty on 50 per cent. less air than is required by rotary or other makes of air drills. It has no vibration, can be run in a bath of oil and will work very close to a corner.

"Little Giant" Pneumatic Hammers are made in seven sizes—a size for every service. They save fully 30 per cent. in air over ordinary pneumatic hammers, because they have a regulator which lets in the air exactly as it's wanted, and because they cushion on the exhaust instead of on live air. "Little Giant" Long Stroke Hammers drive rivets perfectly up to 1 inch without jarring the operator. This hammer has only three moving parts—less than any other long stroke hammer in the business. Ask for Catalog "E" and study it for profit.

STANDARD PNEUMATIC TOOL COMPANY,

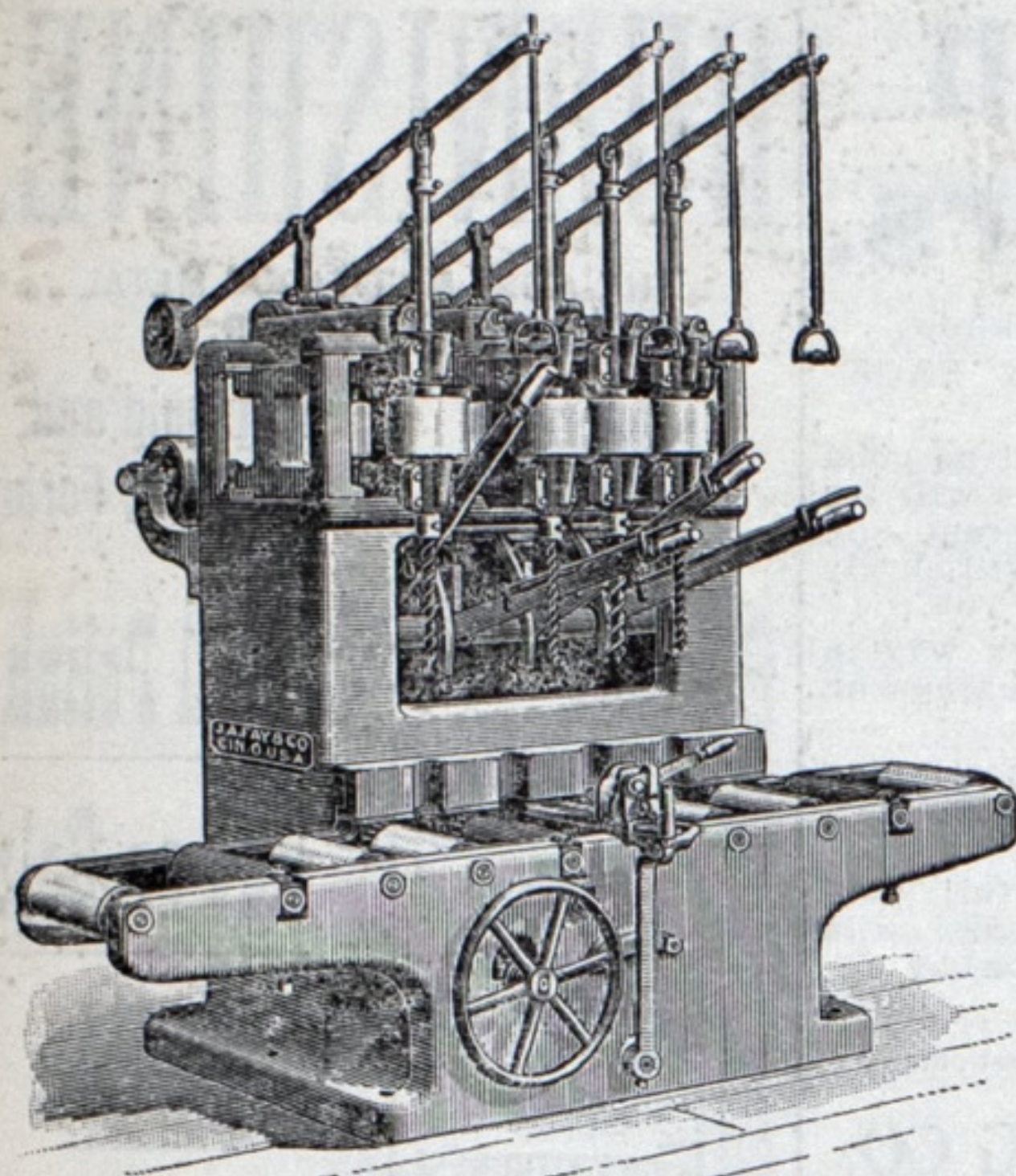
MANUFACTURERS OF ALL KINDS OF PNEUMATIC TOOLS AND APPLIANCES.

Main Offices, Marquette Building, CHICAGO, ILL.

NEW YORK OFFICE, 141 BROADWAY.

FOUR-SPINDLE BORER FOR HEAVY WORK.

A machine, patented Feb. 6, 1900, and recently placed on the market by J. A. Fay & Co., 325 to 345 West Front street, Cincinnati, is illustrated herewith. It is the Cincinnati company's heavy, four-spindle vertical ship borer, and present several features that make it especially valuable in ship yards, arsenals and other works where heavy boring is required.



In this machine, special attention has been paid to the driving capacity, making it possible to bore large holes without the usual difficulties. The spindle frames are mounted in "V" slides, carried in a framework on top of the column. The upper slide forms an adjustable gib, operated by a screw from the front side, giving a micrometer adjustment for taking up the wear. All idler pulleys on the spindle frames are fast to the shaft and mounted in capped bearings. The automatic belt-tightener is supported in the same manner as the spindle slides, and controlled by weight and bell crank. This construction relieves the belt of

all strain when the machine is stopped, and when starting the slack in the belt is taken up automatically. The necessary lever clamping devices are supplied on the table for holding the material firmly in position. The table, as shown in the illustration, is stationary, and a steel traveling carriage can be furnished of any length required. The manufacturers will be pleased to furnish prices and full particulars to those of our readers who may be interested, and will forward their new 394-page illustrated catalogue free.

ROBERTS WATER TUBE BOILERS.

Following are some of the steam yachts that will be equipped before the opening of another season with Roberts water tube boilers: Admiral, owned by Mr. Pliny Fisk of New York; new steam yacht (formerly City of Quincy), owned by Mr. H. B. Anderson of New York; Say When, owned by Hon. W. J. White, Cleveland; new steam yacht building on the St. Lawrence river for Mr. W. H. Nichols, president of the General Chem-

The Marine Review wants a representative in every city on the Great Lakes.

ical Co. of New York. Three new steam yachts that are being built by the George Lawley & Son Corporation, South Boston, Mass.; Venice, owned by L. C. Smith of Syracuse, N. Y.; Chetolah, owned by Mr. A. J. Wise of New York; steam yacht not yet named for Mr. James Averill of Champlain, N. Y.

The Roberts company furnished last year to the Craig Ship Building Co. of Toledo a battery of four boilers which indicated about 1,600 H.P. in the St. Mary's river steamer Chippewa. Three of these boilers gave all the steam the engines could use with natural draft. The vessel is 208 ft. over all and of 16 ft. draught. Her regular speed is 18 miles an hour and she has made 22½ miles in one hour. As a result of success with the Chippewa the Roberts company is now filling orders for the same ship yard as follows: Two batteries of four 500 H.P. boilers for each of two fast steamers, which will each be 260 ft. long, making eight boilers in the two steamers; two batteries of two 500 H.P. boilers each for two smaller steamers, 180 ft. long. This makes a single order of 6,000 H.P. of Roberts boilers. This certainly speaks well for the reputation of this boiler on the great lakes.

Settlers' rates via the Nickel Plate road—Beginning with Tuesday, Feb. 12, low rate settlers' tickets will be on sale every Tuesday to and including April 30, to Oregon, Montana, Washington and all points in the Northwest. Write, wire, 'phone or call on the nearest agent, C. A. Asterlin, T. P. A., Ft. Wayne, Ind., or E. A. Akers, C. P. & T. A., Cleveland, O. 10 April 30

"Seaboard Steel Castings."

MANUFACTURERS OF
"THE ADMIRAL" ANCHOR.

THE LATEST AND BEST
STOCKLESS ANCHOR.
APPROVED BY LLOYD'S.

ANCHORS CAST AND TESTED ON
ORDER, OR STOCK ORDERS
PROVING FILLED.

A GUARANTEE OF QUALITY.

OPEN-HEARTH STEEL CASTINGS
OF THE HIGHEST GRADE.
FACILITIES FOR CASTINGS UP TO
80,000 POUNDS WEIGHT.

MACHINE WORK AND PATTERNS
FURNISHED WHEN REQUIRED.

RAIL OR WATER DELIVERIES.

CAPACITY, 150,000 TONS PER MONTH

Seaboard Steel Casting Co.,
CHESTER, PA.

"BENEDICT-NICKEL" SEAMLESS TUBING

FOR CONDENSER TUBES

Benedict & Burnham Mfg. Co., Mills and Offices, Waterbury Conn.
New York, 253 Rd'wy. Boston, 172 High St. Chicago, Cor. Lake & Clark Sts.

Contains NO ZINC
nor any weaken-
ing metal.

Send for Booklet with
treatise on "Electrolysis
of Condenser Tubes."

BELLEVILLE GENERATORS

Grand Prix 1889
Originated 1849

Hors Concours 1900
Latest Improvements 1896

Number of Marine Leagues made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australian	Polynesian	Armand Behic	Ville de la Ciotat	Ernest Simons	Chili	Cordillere	Laos	Indus	Tonkin	Annam
1890.....	22,576	820									
1891.....	22,749	22,777	68								
1892.....	22,749	22,801	23,274	7,753							
1893.....	22,793	22,781	22,762	22,749							
1894.....	22,813	22,789	22,858	22,813	12,567						
1895.....	22,891	22,922	22,913	22,936	13,629	9,571					
1896.....	23,178	30,906	23,232	23,183	20,735	21,051	13,572				
1897.....	22,750	23,202	30,912	23,185	20,745	25,370	21,119	14,382			
1898.....	23,646	23,178	23,184	23,199	20,842	21,080	21,080	20,851	21,318	7,569	
1899.....	23,178	23,205	22,477	30,135	20,082	20,926	20,956	17,448	18,285	14,669	7,628
Total.....	229,323	215,381	191,680	175,953	108,600	97,998	76,727	52,681	39,603	22,238	7,628

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.

WORKS AND YARDS OF L'ERMITAGE ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT DENIS, SUR SEINE.

M. T. Davidson, manufacturer of pumps, Brooklyn, N. Y., has on hand considerable marine work. He is now making pumps, condensers, ash ejectors and distilling apparatus for the following vessels: United States navy—Dolphin, Mayflower, Cincinnati, Raleigh, Buffalo, Wompatuck, Tacoma, Chattanooga, Galveston, Cleveland, Denver, Barney, Bagley, Biddle, Wilkes, Dale, Decatur, McDonough, Lawrence, Blakely, De Long, Nicholson, O'Brien, Shubrick, Stockton, Thornton, Tingey, Stewart, Truxton, Whipple, Worden, Florida, Arkansas, Nevada, Wyoming; transports Missouri, Crook, Burnside, McClellan, Rawlins, Buford, Sumner, Sedgwick, McPherson, Logan, Kilpatrick, Meade, Wright, Reno; steam yachts Marjorie, Savrock, Sapphire, Dreamer, Marion, Alvina, Kiteawan, Sagamore, Lagunda, Aloha, Pioneer; United States coast survey steamer Bache; United States dredge Sabine; two Clyde line steamships, building at the works of the Cramps; steamship Horatio Hall, Maine Steamship Co.; Chesapeake & Ohio Railway Co.'s steamship building at the Wm. R. Trigg Co.'s works, Richmond, Va.; steamship City of Para, Pacific Mail Steamship Co.; steamship Caracas, Red D line; steamship Dorchester, Merchants & Miners' Transportation Co.

The Marine Engineers' Beneficial Association of Seattle, Wash., has issued a year book that is far above the ordinary directories published

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland,
Date of March 6, 1901.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	39½	39½	39½	39¼
American Steel & Wire, Pfd.....	96½	96½	96½	96½
Federal Steel	44½	44½	43½	44
Federal Steel, Pfd.....	89	89½	88¾	89
National Steel	45½	46¼	45½	46¼
National Steel, Pfd.....	101½	101½	101½	101¾
American Tin Plate	62½	62½	62	62
American Tin Plate, Pfd.....	102	102	101¾	102
American Steel Hoop.....	36¾	36¾	36¼	36¼
American Steel Hoop, Pfd.....	82½	82½	81½	82
Republic Iron & Steel	15½	15¾	15½	15¾
Republic Iron & Steel, Pfd.....	65	65¼	65	65¼

by the branch organizations of marine engineers throughout the country. It contains 245 pages. The list of names and addresses of engineers includes all in the vicinity of Seattle. The book sells for \$1.50 and may be had by addressing M. E. B. A. No. 38, P. O. box 228, Seattle, Wash.

Ahead of all Competitors.

That's what our patrons say and know. They are talking about GARLOCK PACKINGS.

There are none better, and the "just as good kind," which unprincipled dealers will try and palm off on you, is indifferent and inferior stuff, the use of which will surely disappoint and make trouble for you.

We will co-operate with you in every way in the successful use of reliable packings on your plant.

No matter what trouble you are experiencing in this connection we will overcome it if you will give us an opportunity.

Write our nearest office, giving full particulars as to your requirements, and your wants will receive attention by return mail.

Send for catalogue and samples to our nearest office.

THE GARLOCK PACKING CO.

NONE
GENUINE



WITHOUT
IT.

New York. Philadelphia. St. Louis.
Boston. Pittsburgh. Denver.
Chicago. Cleveland. San Francisco.

MAIN OFFICES AND FACTORIES:
PALMYRA, N. Y.; ROME, GA.

BURNISHINE.

THE MOST MARVELOUS METAL
POLISH IN THE WORLD.



In Liquid and
Paste Form.

Will Polish

Hot or Cold

Metal,

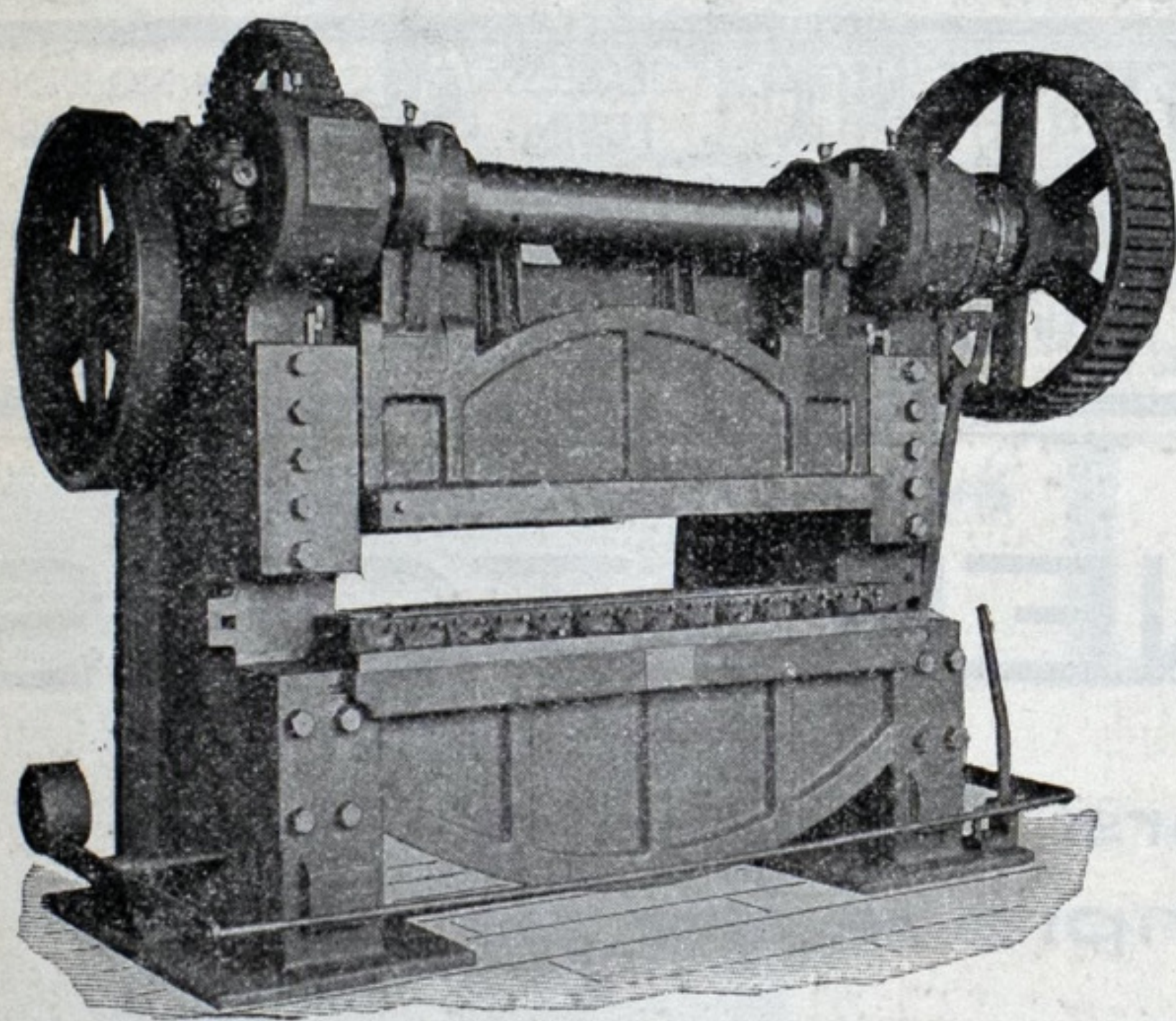
no matter which.

Produces a wonderfully brilliant lustre on brass, copper, nickel and all metals, no labor required.

Used on steamers all over the world. Free samples on application.

J. C. PAUL & CO.

57 Dearborn St., CHICAGO, ILL.



This illustration shows our

GATE SHEAR

which we build either as a Shear or as a Multiple Punch.

DISTANCE BETWEEN HOUSINGS IS 42 IN.
DEPTH OF THROAT 7 IN.

This machine has an adjustable holding down arrangement for holding the plate level while same is being sheared. We build this machine with any capacity desired, and will be pleased to quote price upon application.

The Cleveland Punch and Shear Works Co.,
CLEVELAND, O., U. S. A.

Steamer Adventure for Sale at \$5,000.

She is 108 ft. long, 24 ft. beam, 8.3 ft. deep, has two spars, carries 300 tons on 9 ft. of water, has one Otis steel boiler, one 18x18-in. engine and will make 10 miles per hour. She is allowed 100 lbs. steam. Everything in good condition. Laid up at Sandusky. Address Fred. Groch, Sandusky, O.
March 7.

TO CLOSE AN ESTATE.

We offer for sale the entire plant of J. B. Wilson & Co., Detroit, Mich.,—foundry, machine shop, blacksmith shop, office and storeroom buildings, with patterns, machinery and tools; or will lease to responsible parties for a term of years. Address J. B. Wilson & Co., Detroit, Mich.
tf

Patterns and Drawings for Sale.

Complete patterns and working drawings for 6 by 6 in. duplex hoisting or deck engine and pumps. J. B. Wilson & Co., Detroit, Mich.
tf

Patterns for Compound Engine for Sale.

Complete patterns and working drawings for fore-and-aft compound engine, 15 and 27 in. by 22 in. J. B. Wilson & Co., Detroit, Mich.
tf

STEAM YACHT FOR SALE.

A small, nicely-equipped, private steam yacht in perfect order. Dimensions: Over all, 57 ft.; beam, 8 ft.; draught, 4 ft. 2 in. Commodious forward and after deck with large pilot-house and comfortable trunk cabin. Having purchased a larger yacht, will sell this at a great sacrifice. Full particulars will be given by addressing O. P. Letchworth, Buffalo, New York.
Mar. 28.

Schooner L. S. Hammond For Sale.

We offer this vessel at a very reasonable price. She is at our dock in this city, where she can be seen and examined. Full particulars will be given by calling at our office or writing to address below. Ogdensburg Coal & Towing Co., 44 & 46 North Water street, Ogdensburg, N.Y.
Mar. 21.

TUG FOR SALE AT A BARGAIN.

Fishing tug Fred King. One of the best on Lake Erie. Robison Basket Co., Painesville, O.
Mar. 25.

FREIGHT AND PASSENGER STEAMER

A. B. Taylor is for sale. Vessel 106 ft. keel, 22 ft. beam. Freight capacity, 115 tons; passengers, 200. Electric light; good sea boat; speed, 11 miles; economical. E. C. Dunbar, Grand Haven, Mich.
Mar. 7

LUMBER CARRIERS FOR SALE.

Stmr. White Star capacity 350,000 feet.
Barge Eva S. Robinson " 560,000 "
Schr. Annie P. Grover " 340,000 "
Schr. John Miner " 350,000 "
All A2 and A2½ and in good condition. Arthur B. Slyfield, Port Huron, Mich.
Feb. 21.

FIVE ELECTRIC PASSENGER LAUNCHES FOR SALE.

In fine condition. Length over all, 35 feet. Seating capacity, 28. Send for price list. Yacht brokers, please note. Milwaukee Electric Launch Co., 1504 Monadnock Block, Chicago.
tf